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ABSTRACT

Presented is a third supplement to previous lists of references. This document is a compilation collected by the Calculator Information Center between March 1982 and March 1983. Included are references which previously appeared on bulletins distributed by the center, plus articles in newsletters and similar less readily available sources and from non-American sources. Most references are annotated; all include a limited set of descriptors or keywords which denote the focus or contents of the references. At the end of the listing is an index for each descriptor. (MNS)

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Calculators:

A Categorized Compilation of References

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with

Mary Margand

Supplement 3

March 1983

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Calculators: A Categorized Compilation of References

Since March 1977, the Calculator Information Center has met the dual functions of collecting and disseminating information about the use of calculators in education. This document lists references collected by the Center between March 1982 and March 1983, supplementing three previous compilations (Suydam, 1979, 1980, 1982). The majority of these references have appeared on Reference Bulletins distributed by the Center. Two additional types of materials cited here were not included in those bulletins:

(1) Articles from sources not readily available to wide audiences.

(2) Articles and other documents from non-American sources.

Many of these documents were located through the bibliographic section of the journal, Zentralblatt für Didaktik der Mathematik. The Soviet references were supplied by Dr. T. Romanovskis, Latvian State University, Riga, Latvia, USSR. Our appreciation is extended to them for their help, as well as to others who have sent references to us.

The alphabetized listing of references includes, in parentheses, a limited set of descriptors or keywords which denote the focus or contents of the references. At the end of the listing is an index to help the reader locate documents of interest. However, some descriptors which could have been applied to a particular reference might not be listed. Such omissions generally occurred because the descriptor did not come to mind as the reference was scanned. It is suggested that readers might add their own notes of references appropriate in each category.

In the majority of instances, the references are annotated. In a small percentage of cases, however, no annotation is included; this occurred most often because the document was not available at the Center.

The descriptors should reflect what is known about the contents of such documents, as indicated by the title.

It is hoped that this compilation will be of aid to teachers, to researchers, and to others who need and want references on calculators.

References

Suydam, Marilyn N. Calculators: A Categorized Compilation of References. Columbus, Ohio: Calculator Information Center, June 1979. Available for purchase from the ERIC Clearinghouse for Science, Mathematics and Environmental Education. See also ERIC: ED 171 152.

Suydam, Marilyn N. Calculators: A Categorized Compilation of References. Columbus, Ohio: Calculator Information Center, December 1980. ERIC: ED 199 087.

Suydam, Marilyn N. Calculators: A Categorized Compilation of References. Columbus, Ohio: Calculator Information Center, March 1982. ERIC: ED 213 598.

Calculators: A Categorized Compilation of References
(Compiled March 1982 - March 1983)

Abel, H. et al. Mathematik für Lehrer der Sekundartsufe I/Hauptschule. HE 7 (Mathematics for Junior High School Teachers. Unit 7). Weinheim, West Germany: Beltz, 1980.

This book for teachers of mathematics at the junior high level has information on the operation and function of calculators and gives general suggestions for using calculators in lessons. (In German.)

(Junior high (grades 7-9), Recommendations, Teachers)

Afanasjev, J. Microcalculator and New Fields of Development of Mathematics. In Modern Problems in Teaching Mathematics. Esthonia, USSR: Tallinn, 1979. Pg. 109-112.

The calculator's role in prompting new directions in mathematical research, and the possible impact this will have on mathematics education, is discussed. (In Russian.)

(Recommendations, Roles, Teachers)

af Ekenstam, Adolf and Kvist, Rune. Miniräknaren I So-Matematiken (Interimsrapport efter So 1, åk 1 av Två-årig gymnasielinje). Sweden: Universitetet I Linköping, Nr1/78.

Most of this booklet deals with calcualtor uses for basic arithmetic skills, consumer mathematics, and mathematical crossword puzzles. (In Swedish.)

(Curriculum, Elementary, General Mathematics, Junior high)

Ahrens, H. Nimmt der Taschenrechner dem Schueler zuviel Arbeit ab? (Do Pocket Calculators Facilitate the Pupils' Work Too Much?) Lehrmittel Aktuell 7: 20-21; July 1981.

Two examples for classrooms show the mental performance necessary for using a pocket calculator. (In German.)

(Four-function calculators, Secondary, Pros/cons)

Aichele, Douglas B. Interface: Euclidean Construction Tools and the Calculator. School Science and Mathematics 82: 702-708; December 1982.

The author feels that classical construction tools and now the calculator are too frequently used for purposes other than the understanding and discovery of mathematical principles. Three examples are presented which involve the use of compass, ruler, and calculator to further mathematical problem-solving skills.

(Activities, Geometry, Measurement, Secondary)

Alle, G. Differentialrechnung mit programmierbaren Taschenrechnern (Differential Calculus with Programmable Pocket Calculators). Didaktik der Mathematik 7: 180-188; 1979.

The programmable calculator is used to find derivatives of common functions, to determine approximate roots of polynominals, and to evaluate f (x) = lnx. (In German.)

(Calculus, College, Derivatives, Programmable calculators, Programming)

Alle, G. Pythagoras und der Taschenrechner (Pythagoras and the Pocket Calculator). Scholle 47: 888-894; November 1979.

The Pythagorean Theorem is used to illustrate the author's opinion that lessons oriented towards inductive, genetic, and operative principles can make successful and efficient use of pocket calculators. (In German.)

(Activities, Secondary)

Alt, H. Angewandte Mathematik, Finanzmathematik, Statistik, Informatik für UPN-Rechner (Applied Mathematics, Financial Mathematics, Statistics, Computer Science for RPN-calculators). Braunschweig, West Germany: Vieweg, 1979.

This book introduces the reader to the programming of pocket calculators which use reverse Polish notation and offers examples from the fields of applied mathematics, financial mathematics, statistics, and computer science. (In German.)

(Business, Engineering, Post-secondary, Programmable calculators)

Alt, H., et al. Taschenrechner + Mikrocomputer. Jahrbuch 1980. (Pocket Calculators + Microcomputers. Yearbook 1980). Braunschweig, West Germany: Vieweg, 1979.

This yearbook includes sections on calculators - their use, various models, and a list of literature. (In German.)

(Marketing, Post-secondary, References, Related (technology))

Baker, John; Easen, Patrick; Graham, Alan; and Tyler, Ken. Calculators in the Primary School. Milton Keynes, England: The Open University, Shell Centre for Mathematical Education, 1982.

The authors explore the role of the calculator in the learning and using of mathematical skills at the primary level. The book is intended to be used as a basis for self-study, but is also appropriate as a text for a course on the use of calculators in the primary school. Video tape extracts and a tutor guide are available for this latter purpose.

(Activities, Classroom management, Curriculum, Elementary, Games, Worksheets)

Bardy, P., et al. Taschenrechner im Mathematikunterricht (The Use of Pocket Calculators in the Mathematics Classroom). Didaktik der Mathematik 10: 121-159; September 1978.

Several aspects of the use of calculators in the mathematics classroom of various types of schools are discussed. (In German.)

(Curriculum, Recommendations)

Bartalo, Donald B. Calculators and Problem-Solving Instruction: They Were Made for Each Other. Arithmetic Teacher 30: 18-21; January 1983.

The author's thesis, based on several years of experimentation, is that the calculator can definitely help elementary students to become better problem solvers.

(Course description, Elementary (grades 3-6), Problem solving, Recommendations)

Beakley, George C. and Lovell, Robert E. Computation, Calculators and Computers: Tools of Engineering Problem Solving. New York: Macmillan, 1983.

(College, Engineering, Related (computers))

Beardslee, Edward C. Funtastic Calculator Math. Sunnyvale, California: Enrich, 1978.

This book, in worksheet format, includes applications and games to supplement the basic curriculum.

(Games, Worksheets)

Beardslee, E. Calculator Math. Palo Alto, California: Dale Seymour Publications, 1982.

Calculator games and exercises designed for grades 4-8 are provided on reproducible worksheets. Answers are included.

(Activities, Elementary, Four-function calculators, Games, Junior high, Problem solving)

Bell, Alan; Swan, Malcolm; and Taylor, Glenda. Choice of Operation in Verbal Problems with Decimal Numbers. Educational Studies in Mathematics 12: 399-420; November 1981.

Exploratory interviews revealed some conceptual problems that children experience in attempting to solve verbal problems which contain decimal numbers. A diagnostic test was designed and then administered to a class of less-able 14-year-olds. Calculator-enriched teaching materials designed to remedy the identified misconceptions were prepared. Pre- and posttest results showed "dramatic success" in improving pupils' understanding of place value and modest improvement in enabling pupils to choose the correct operation by drawing diagrams, using easier numbers, and estimating.

(Achievement, Decimals, Low achievers, Place value, Problem solving, Research, Secondary (age 14))

Bell, A. W. Treating Student Misconceptions. Australian Mathematics Teacher 38: 11-13; October 1982.

The author suggests that too much mathematics teaching is directed toward developing automatic associations and reactions at the expense of higher level reasoning strategies. Three experiments (one in which the students use calculators) are given which illustrate the author's own approach to mathematics teaching.

(Diagnosis, Junior high, Problem solving)

Bennett, A. Wayne. Computers in Electrical Engineering Education at Virginia Polytechnic Institute. CoED 2: 7-11; March/April 1982.

The bulk of this article deals with the use of various kinds of computing power in engineering education. Some mention is made of calculators and their integration into the engineering curricula at Virginia Polytechnic Institute.

(College, Electronics, Engineering, Related (computers))

Bernard, Julian. More Meaning Power to the Zero Power. Mathematics Teacher 75: 251-252; March 1982.

An intuitive preparation for $n^0 = 1$ is provided through the use of successive roots. Students use calculators to compute $n^{\frac{1}{2}}$, $n^{\frac{1}{4}}$, $n^{1/8}$, etc., and observe that, as the exponent approaches zero, the value of n^x approaches 1. The author turns to more formal mathematics to consider the cases where $0 < n < 1$, and where n is negative or complex.

(Exponents, Iteration, Roots)

Bestgen, Barbara J.; Stuart, Maureen; and Taylor, Gloria. Patterns, Calculators--Bullseye! School Science and Mathematics 82: 463-465; October 1982.

The authors suggest a calculator activity which gives second graders experience in noticing and using number patterns and which may make the study of computational algorithms more meaningful to them.

(Addition, Elementary (grade 2), Estimation, Pattern searches)

Bevis, Jean H. and Boal, Jan L. Continued Fractions and Iterative Processes. Two-Year College Mathematics Journal 13: 122-127; March 1982.

The bulk of the article describes an iterative method of approximating square roots which is used to provide a natural introduction to continued fractions. Calculators or computers can be used to perform the computations.

(Activities, College, Iteration, Numerical analysis)

Bezuszka, Stanley J. and Kenney, Margaret. Number Treasury - A Sourcebook of Problems for Calculators and Computers. Palo Alto, California: Dale Seymour Publications, 1982.

The problems in this collection can serve a variety of purposes (drill and practice in arithmetic, problem solving in number theory, and calculator/computer exercises). The book is also a source of information on the history and development of various categories of numbers.

(Activities, Prime numbers, Problem solving, Programming, Related (computers))

Bidwell, James K. Some Functions on the Digits of a Number. Mathematics in School 11: 23-25; May 1982.

Students are encouraged to use calculators and computers to discover certain properties of the integers that they can then prove algebrically.

(Integers, Problem solving, Proof, Secondary)

Billstein, Rick and Lott, Johnny W. More Reflections on Teaching Mathematics for Elementary School Teachers. Arithmetic Teacher 29: 37-38; January 1982.

Calculators are an intergral part of the methods courses for elementary teachers described in this article. Types of calculators, uses of calculators in the classroom, and a review of the current research on the use of calculators in the elementary school are part of the courses

(Course description, Elementary, Teachers (preservice))

Bitwistle, C. Maths with a Calculator. London, England: Arnold, 1982.

The calculator is used in a variety of activities and everyday applications.

(Activities, Consumer application)

Blakeley, Barry; Girling, Michael; Watson, F. R.; and Wilson, William Wynee. Algebra with Calculators. Leicester, Great Britain: Mathematical Association, 1981.

The authors present an approach to elementary algebra which emphasizes the use of flowcharts, in place of more traditional formulas, to express numerical relationships. Wherever possible, the authors prefer numerical methods to the more common analytic methods of teaching algebra; calculators facilitate this approach.

(Activities, Algebra, Flow charts, Junior high, Secondary)

Blendin, W. Doppeltgenaues Rechnen mit programmierbaren Rechner (Double-precision Calculation with Programmable Calculators). Praxis der Mathematik 21: 291-296; October 1979.

A method which nearly doubles the normal number of accurate digits displayed by a calculator is described. (In German.)

(Algorithms, Calculator keys, Calculator memory, Significant figures)

Bozuwa, Leen. Probeersels van een Mavoleraar: Een Begin? (Problems: In the Beginning?). Euclides 54: 352-355; May 1979.

The author discusses the use of memory registers and explains how this feature in calculators is especially helpful when a problem requires iteration. (In Dutch.)

(Calculator keys, Calculator memory, Iteration)

Brockmann, Ellen M. (Ed.). Teaching Handicapped Students Mathematics: A Resource Handbook for K-12 Teachers. Washington, District of Columbia: National Education Association, 1981. ERIC: ED 213 218.

This handbook is intended to assist teachers in mainstreaming handicapped students. One paper in Part Two is concerned with exceptional students' needs and the calculator.

(Curriculum, Elementary, Handicapped (visual, LD, EMH), Secondary)

Brolin, Hans. ARK - Gruppens Verksamhet, En Översikt (ARK Project, An Overview). Nämnaren 5: 7-10; December 1978.

The members of the A.R.K. ("Analys av räknedosornas honsekvenser") group, their objectives, and an outline of the project's proposal are mentioned. (In Swedish.)

(Evaluation, Recommendations)

Brolin, Hans. Kort Sammanfattning av Inledningsanförandena vid DOS-Konferensens Plenardiskussion (Conference Summary). Nämnaren 5: 75-77; December 1978.

The results of a conference on the place of calculators in the mathematics classroom are recorded. (In Swedish.)

(Recommendations, Roles)

Bromm, K. U. Programmierbare Tashenrechner in Schule und Ausbildung: Grundlagen und Anwendungen des Programmierens (Programmable Pocket Calculators in School and Job Training: Fundamentals and Applications of Programming). Braunschweig, West Germany: Vieweg, 1979.

The fundamentals of programming techniques are explained. The nucleus of the book is a set of 40 interesting applications in the fields of algebra, number theory, statistics and probability, calculus, and science. (In German.)

(Programmable calculators, Secondary (grades 10-12))

Bromm, K. U. Beispiele für den Einsatz des programmierbaren Taschenrechners (PTR) in der Mathematik und Physik der Sekundarstufen (Examples for the Use of the Programmable Pocket Calculator in Mathematics and Physics at Secondary Level). In Zum Einsatz von Taschenrechnern im Unterricht (On the Use of Pocket Calculators in the Classroom) (H. Holler, Ed.). Düsseldorf, West Germany: Schwann, 1980.

Examples of the use of the programmable calculator in mathematics and physics include elementary number theory, regression analysis, and empirical formulation of physical laws. (In German.)

(Physics, Programmable calculators)

Brown, Lynn. Calculator Update. Math Lab Matrix 17: 7; Spring 1982.

The author cites general findings of the many research studies completed on calculator use since 1975. Studies have shown that calculators have not harmed children's computational skills and that their use does not affect problem-solving scores significantly.

(Research (summary), Status report)

Brown, S. I. and Rising, G. R. The Development of New Curriculum for the New Calculation. Computing Teacher 8: 52-55; No. 2, 1980-81.

This article focuses on some possible new curriculum directions for calculators and computers in education, with a general outline.

(Curriculum, Recommendations)

Cavaseno, Vincent. Calculator Programs for Chemical Engineers. New York: Chemical Engineering, 1982.

Calculator algorithms simplifying the mathematical procedures necessary for a variety of problems in chemical engineering are presented.

(Chemistry, College, Programmable calculators)

Christman, J. Richard; Halliday, David; and Resnick, Robert. Physics Problems for Programmable Calculators: Wave Motion, Optics, and Modern Physics. New York: Wiley, 1982.

A collection of problems whos solutions require the use of programmable calculators is provided.

(College, Physics, Programmable calculators)

Clare, Brian W. Solution of Mass Action Problems on a Programmable Calculator. In Computer Series 25. Journal of Chemical Education 59: 133-134; February 1982.

A program for the HP 41C programmable calculator solves systems of nonlinear equations by the Newton-Raphson method.

(Chemistry, College, Programmable calculators)

Clarke, F. H. Calculator Programming for Chemistry and the Life Sciences. New York: Academic Press, 1981.

(Chemistry, College, Programmable calculators)

Clyde, Donald. The Tin Can Problem. Calculators/Computers 1 (3): November 1977.

The common tin can is used as a mathematical model to explore volume and surface area relationships. Two worksheets are presented, one for calculators, the second for use with a computer.

(Activities, Problem solving, Programmable calculators, Related (computers), Secondary, Worksheets)

Conradt, R. Taschenrechnerkurs (A Calculator Course). Paderborn, West Germany: Schoeningh, 1979.

Twenty-six worksheets for grades 8/9 or 9/10 provide practice in the use of calculators. (In German.)

(Junior high (grades 8, 9), Secondary (grade 10), Worksheets)

Cook, Lyle and McWilliam, James. A Simple Calculator Algorithm. Two-Year College Mathematics Journal 14: 52-54; January 1983.

The authors demonstrate that the problem of finding cube roots, when limited to a calculator with only square root capability, can illustrate some elementary mathematical theory that would go unnoticed when using a more sophisticated machine.

(Algorithms, College, Iteration, Roots, Secondary)

Croquette, C. and Guinet, R. Un Exemple d'Activites petites Machines au C. M. (An Example for the Use of the Calculator at Primary Level.) Grand N 20: 25-40; February 1980.

The authors describe the pros and cons of the use of calculators at school, with some remarks on the choice of a calculator. (In French.)

(Elementary (grades 4-5), Pros/cons, Selection)

Cutchins, M. A. Programmable Calculator Use in Undergraduate Dynamics, Vibrations, and Elementary Structures Courses. CoED 2: 7-12; January/February 1982.

Selected engineering problems make use of programmable calculators. All problems illustrated have the following characteristics: (a) repetitive solutions are necessary; (b) the problems are general in scope, and (c) only the final results have real meaning. Label keys, magnetic cards or storage modules, and a printing capability are necessary calcualtor characteristics for these problems.

(College, Engineering, Programmable calculators)

Daniel, J. C. Utilisation de Calculettes en Classe de Seconde (Using Calculators at Upper Secondary Level). France: Institut de Recherche sur l'Enseignement de Mathematiques (IREM), May 1981.

This booklet contains suggestions related to the treatment of the following topics using calculators: accuracy of addition and multiplication, evaluation of square roots, finite differences, and difference equations. (In French.)

(Secondary (grades 10-12))

Dearing, John. Calculator Tips and Routines: Especially for the HP 41C-41CV. Corvallis, Oregon: Corvallis Software, 1981.

Ideas for using calculators are given.

(Activities, Programmable calculators)

De Jong, W. E. Rekenmachientjes bij Examens (Calculators on Tests). Euclides 54: 379-382; May 1979.

Pros and cons of allowing students to use calculators on exams are discussed. (In Dutch.)

(Recommendations, Testing)

Diepold, P. Taschenrechnerprogramme zur Statistik (Calculator Programs for Statistics). Thun, Switzerland: Deutsch, 1979.

This book contains 30 calculator programs for statistics, with remarks and examples. (In German.)

(Programmable calculators, Statistics)

Dona, Anton. Enkele Notities big Gebruik op [illegible] Lhno. Euclides 54: 359-360; May 1979.

If calculators are to be used in the schools, policies regulating their use must be decided. For example, should students be allowed to use them on exams? The author briefly outlines the issues. (In Dutch.)

(Pros/cons, Recommendations)

Donahue, Gariel Mary. Problem-Solving Strategies Used by Elementary School Children in Solving Routine and Nonroutine Word Problems in Mathematics. (New York University, 1982.) Dissertation Abstracts International 43A: 387-388; August 1982.

From a study of the behavior of second- and fourth-grade children, the author concluded that problem-solving techniques can be formally introduced into the curriculum at the second-grade level.

(Elementary, Problem solving, Research, Testing)

Donegan, Brian. TOPICS. Calculator Fractions. Australian Mathematics Teacher 37: 30-31; January 1982.

A method of adding and multiplying fractions with one-digit numerators and denominators using a calculator is briefly described.

(Fractions)

Duch, Gayle B. The Hand-Held Calculator and Its Potential to Improve the Basic Numerical Operation of the Migrant Mentally Retarded Child in a Tutorial Program. Pleasant Valley, New York. 1982.

Five migrant mentally retarded students took part in this six-week study in which they were first pretested in one basic numerical operation, then instructed in that operation with hand-held calculators, and finally posttested without the use of the calculator. The students did not become dependent upon the calculators, they were able to recognize unreasonable answers, and the use of calculators stimulated interest to the extent that two of the students purchased their own.

(Elementary (primary, intermediate), Four-function calculators, Handicapped (retarded), Mixed operations, Research, Secondary)

Duffy, John A. and Thompson, Gary E. Improving Mathematics Achievement of Elementary Students Through the Use of Electronic Hand Calculators. Columbus, Ohio: Department of Management, Planning and Information, Columbus Public Schools, January 1980. ERIC: ED 209 263.

This report describes and evaluates the two-year Columbus Calculator Project.

(Calculator keys, Classroom management, Elementary, Evaluation, Research, Teachers)

Duffy, E. and Saunders, C.. Know Your Calculator. Stratford-on-Avon, England: Sapphire Books, 1977, 1980.

This guide to using calculators, written at the lower secondary level, is not tailored to any specific model.

(Calculator keys, Calculator logic, Calculator memory, Secondary, Selection)

Duhon, Princelett. Using the Calculator on the Problem of the Rectangular Numerical Approach to Integration. Texas Mathematics Teacher 29: 3-4; January 1982.

A simple program, suitable for a TI 30 calculator, approximates a value through an iterative process.

(Iteration, Scientific calculator, Secondary)

Dunlop, David L. and Sigmund, Thomas F. Problem Solving with the Programmable Calculator. Englewood Cliffs New Jersey: Prentice-Hall, December 1982.

This book is divided into three sections. The first, "Challenges," presents activities involving number curiosities: figurate, prime, and composite numbers; diophantine equations; probability; maximum/minimum; and geometry. The second section is a collection of games appropriate for programmable calculators, and the third section, "Simulations," provides a variety of problems in applied mathematics in the sciences and other fields.

(Activities, Games, Problem solving, Programmable calculators, Programming)

Dunn, James A. Business and Office Education: Instructional Materials. ISSOE Managing Student Progress. Ithaca, New York: Cornell University and New York Institute for Occupational Education, 1981. ERIC: ED 209 462.

This catalog, intended for instructors in occupational education programs, identifies instructional materials found to be successful for teaching specific occupation competencies in the area of business and office education. One of the sections is on calculating machines.

(Business education)

Durgnat, V. La Calculatrice Electronique de Poche (The Electronic Calculator). Vevey, Switzerland: Editions Delta, 1980.

The use of calculator keys, including registers, transformation of angular measures, constants, trigonometric functions, and exponential and logarithmic functions are discussed in detail in individual chapters. (In French.)

(Calculator keys, College, Scientific calculators, Secondary (grades 10-12))

Dyer, Patricia A. (Ed.). American Mathematical Association of Two-Year Colleges Developmental Mathematics Curriculum Committee: Annual Report. ERIC: ED 208 924.

One portion of the report capsulizes the findings of studies of calculator use and impact in two-year colleges.

(College, Research, Status report)

Edgell, John J., Jr. Some Ideas for Using the Calculator with Gifted and Talented Students at the Upper Elementary School Level. Texas Mathematics Teacher 29: 11-13; January 1982.

Brief historical notes (on Eratosthenes, Gauss, Pascal and Moschopulus) accompany the suggested problems (sieve for primes, sums of series, Pascal's triangle, and magic squares).

(Activities, Elementary, Gifted, Pattern searches)

Edwards, Allen. The Hand-Held Calculator in a Third-World Country. Boroko, Papua New Guinea: Numeracy Project, Laloki College, 1982.

This doctoral thesis discusses the Papua New Guinea Department of Commerce's finding that a major hindrance to the development of businesses is the lack of good number skill common among trade store keepers. The author proposes the use of calculators as a means of overcoming this deficiency.

(Business mathematics, Recommendations, Research, Technical mathematics)

Eilers, James E.; Cronin, James; and Joshi, Bhairav D. Computer-Enchanced Instructional Materials for Interactive Fortran. In Computer Series 26. Journal of Chemical Education 59: 209-212; March 1982.

Strategies for incorporating a calculator mode within FORTRAN programs and a Response Analysis Scheme used during interactive sessions are described.

(Chemistry, College, Related (computers))

Engel, A. Algorithmen für den Taschenrechner (TR) (Algorithms for the Pocket Calculator). Mathematikunterricht 25: 52-77; 1979.

Various algorithms that can be performed on the calculator are presented.

(Algorithms)

Ethelberg-Laursen, Af J. Lommeregnere på Mellemtrinnet? (Report on a Project in Århus). Matematik 5: 30-56; June 1977.

This reports present data on the results of the project, as well as comments on what the project involved. (In Danish.)

(Elementary, Recommendations, Research)

Etlinger, Leonard and Ogletree, Earl J. Using Calculators and Microcomputers with Exceptional Children. Chicago, Illinois: Chicago State University, March 1982. ERIC: ED 215 884.

Some specific ways of using calculators and microcomputers to benefit exceptional children are provided.

(Activities, Elementary, Handicapped (blind/retarded), Learning disabilities, Related (computers), Selection)

Fabrey, Lawrence John. The Effects of Calculator Usage and Task Difficulty on State Anxiety in Solving Statistics Problems. (The Pennsylvania State University, 1982.) Dissertation Abstracts International 43A: 729; September 1982.

Even a very basic calculator was found to allow students to solve statistics problems more quickly and accurately and with less anxiety about the problem-solving situation.

(Anxiety, College, Research, Statistics)

Fallbeck, Patricia Denise. The Use of Hand-Held Calculators in the Instruction of Addition Combinations with Retarded Adults. (University of Northern Colorado, 1982.) Dissertation Abstracts International 43A: 101-102; July 1982.

The use of the abacus in learning basic addition combinations was found to be more effective than the use of calculators with retarded adults.

(Addition, Handicapped (retarded), Post-secondary, Research)

Farber, M. U. Der Taschenrechner in Unterricht und Praxis (The Pocket Calculator in Class and Practice). Köln, West Germany: Aulis Verl. Deubner, 1979.

This volume deals with the utilization of calculators for instruction, covering very simple to complicated programmable devices. The book provides background information for teachers. (In German.)

(Roles, Teachers)

Fisher, William B. and Jones, Jim N. Large Numbers and the Calculator. In Mathematics for the Middle Grades (5-9) (Linda Silvey and James R. Smart, Eds.). 1982 NCTM Yearbook. Reston, Virginia: National Council of Teachers of Mathematics, 1982. Pp. 130-141. ERIC: ED 214 776.

A series of lessons that have been presented to children from grades 4 through 9 is summarized. Suggestions for each of the four operations with large numbers are presented separately.

(Addition, Division, Elementary (grades 4-6), Junior high (grades 7-9), Large numbers, Multiplication, Problem solving, Subtraction)

Fletcher, B. Use of Calculators - The Problem as Seen by the Classroom Teacher. Paper presented at the Seminar on Calculators in School Teaching, Luxembourg, Luxembourg, May-June 1978.

The author reviews the background of the introduction of calculators into schools in England. Topics include curriculum development, research and evaluation, teacher education, and dissemination.

(Curriculum, Pros/cons, Status report, Teachers)

Forsyth, Robert A. and Ansley, Timothy N. The Importance of Computational Skill for Answering Items in a Mathematics Problem-Solving Test: Implications for Construct Validity. Educational and Psychological Measurement 42: 257-263; Spring 1982.

Computational skill was not found to be a major contributing factor to students' scores on a subtest of the Iowa Tests of Educational Development.

(Problem solving, Research, Secondary, Testing)

Free, John. Hand-held Printing Calculators. Popular Science 220: 90-91; April 1982.

Various recent models of hand-held printing calculators are compared.

(Marketing)

Friedman, Herb. Calculator or Computer -- Which Should You Pocket? Popular Mechanics 158: 68; August 1982.

The author describes the differences between programmable calculators and pocket computers. Several brand names are compared and recommendations for the consumer are made.

(Marketing, Programmable calculator, Related (computers), Selection)

Garrison, Paul. Programming the TI-59 and the HP-41 Calculators. Blue Ridge Summit, Pennsylvania: Tab Books, 1982.

(Programmable, Programmable calculators)

Gatford, J. D. and Pitman, C. Calculator Exercises for Year Nine and Calculator Exercises for Year Ten. London, England: Longman Cheshire, 1979, 1980.

Activities in worksheet format each focus on one topic (Year Nine: basic operations, money, mensuration, trigonometry, algebra; Year Ten: general operations, applications, money, trigonometry, mensuration).

(Activities)

Giese, Madeline. Contests. Calculator Tournament. Calculators/Computers 1 (3): November 1977.

A tournament is briefly described. Organizational details are discussed but no contest questions or sources of appropriate problems are included.

(Activities, Elementary (grades 5-6), Games, Junior high (grades 7-9), Secondary (grades 10-12))

Gilde, W. and Altrichter, S. Mehr Spass mit dem Taschenrechner (More Fun with Pocket Calculators). Thun, Switzerland: Deutsch, 1980.

This book shows through examples what a calculator is able to do, what it can be used for, and some of its advantages. (In German.)

(Roles)

Gimmestad, B. J. Calculator Instruction for Engineering Students - An Alternative Approach. Engineering Education 73: 177; 1982.

(College, Engineering)

Gimmestad, Beverly J. The Impact of the Calculator on the Content Validity of Advanced Placement Calculus Problems. Houghton, Michigan: Michigan Technological University, June 1982. ERIC: ED 218 07[illegible].

Nineteen Calculus II students were randomly sampled and divided into calculator and non-calculator groups. These students were asked to "think aloud" while solving 24 Advanced Placement calculus problems. Each student interview was videotaped, coded, and analyzed for reasoning process as well as outcome. The results indicated that the use of calculators affected the testing of basic facts and reasoning processes at the individual problem level, but basic concepts and principles were unaffected.

(Calculus, College, Problem solving, Research)

Gloggengiesser, H.; Kroeplin, E.; and Lhotzky, A. TI-Taschenrechner im Unterricht TI-25, TI-30, TI-45, TI-50, TI-53 (Texas Instruments Calculators in Instruction: TI-25, TI-45, TI-50, TI-53). München, West Germany: Moderne Verlags, 1979.

The possibilities and limits of calculators are demonstrated using TI calculators and examples from physics and mathematics. (In German.)

(Physics, Roles, Secondary (grades 10-12))

Gloistehn, H. H. Mathematische Unterhaltungen und Spiele mit dem programmierbaren Taschnrechner (AOS) (Mathematical Entertainment and Games with Programmable Calculators (AOS)). Braunschweig, West Germany: Vieweg, 1981.

Mathematical games and problems involving probability are presented. (In German.)

(Games, Probability, Programmable calculators)

Gloistehn, H. H. Programmieren von Taschenrechnern. Bd. 2 (Programming Pocket Calculators. Vol. 2). Braunschweig, West Germany: Vieweg, 1978.

This textbook and exercise book describes the programming of the TI 57 calculator. (In German.)

(Programmable calculators, Textbook)

Gloistehn, H. H. Programmieren von Taschenrechnern. Bd. 3 (Programming Pocket Calculators. Vol. 3). Braunschweig, West Germany: Vieweg, 1981.

This textbook and exercise book describes the programming of the TI 58 and TI 59 calculators. (In German.)

(Programmable calculators, Textbook)

Goddijn, Aad. Rekenmachientjes: Een Opgave (Calculators: An Overview). Euclides 54: 342-345; May 1979.

Calculators have certain characteristics which need to be understood before they can be successfully used. For example, 1/2 + 1/4, 1/2 - 1/4, and 1/2 x 1/4 can be punched in directly on most machines, whereas 1/2 ÷ 1/4 cannot. The author discusses the reason for this in a general overview on calculators. (In Dutch.)

(Calculator keys, Calculator logic, Four-function calculators)

Godia, George Imbanga. A Comparative Study of the Effects on Achievement, Changes in Attitude Toward Mathematics and Attrition Rate of Students Enrolled in the Freshman Remedial Arithmetic Course Under Two Different Instructional Approaches. (Ohio University, 1982.) Dissertation Abstracts International 43A: 3412-3412; February 1982.

This study compared two approaches to teaching remedial mathematics at Ohio University. The first method (Math 101) involved small-group instruction using a calculator, an instructional support system, and a textbook. The second method (UC-100) focused on large-group instruction using diagnostic remediation and instructor-made materials. The achievement of Math 101 students was higher, but their attitude improvement level was lower than that of their UC-100 counterparts.

(Achievement, Attitude, College, Remedial, Research)

Goeritz, G. H. and Scheefer, H. J. Der Einsatz programmierbarer Taschenrechner im Mathematikunterricht am Beispiel einiger Standardprobleme (Some Standard Problems - Examples of Using Programmable Pocket Calculators in the Mathematics Classroom). MM-Journal für Moderne Schulmathematik 32: 1-4; September-October 1981.

Instructional advantages of using programmable calculators are presented. (In German.)

(Problem solving, Programmable calculators, Roles)

Goldberg, Kenneth P. Pushbutton Mathematics: Calculator Math Problems, Examples, and Activities. Englewocd Cliffs, New Jersey: Prentice-Hall, 1982.

This book is written for the teacher who wants to know more about what calculators are, how they differ from one another, how to select one, and how to teach with one.

(Activities, Selection, Teachers)

Graves, Susan K.; Gaiser, James E.; and French, John D. General Relativistic Trajectories Using Small Computers. American Journal of Physics 50: 86-88; January 1982.

The authors describe an exercise, suitable for use on programmable calculators or microcomputers, to calculate some of the rapidly processing orbits of a mass M near a static black hole star of mass M.

(College, Physics, Programmable calculators)

Green, D. R. Can You Calculate? London, England: Edward Arnold, 1981.

Given is a set of mathematical problems of varying length and difficulty, to encourage the thoughtful use of a calculator in their investigation and solution.

(Activities, Problem solving)

Greger, Karl. Miniräknaren i Skolmatematiken: En Internationell Överblick Våren 1978 (Calculators in School Mathematics: An International Overview for 1978). Nämnaren 5: 5-6; December 1978.

Sources of information on calculator uses in education in the U.S., Sweden, West Germany, and England are given. (In Swedish.)

(References)

Greger, Karl and af Ekenstam, Adolf. Icke-Algoritmiska Basfärdigheter (Elementary/Secondary Project). Nämnaren 5: 14-15; December 1978.

This brief article includes examples in basic arithmetic which illustrate possible uses of calculators at an elementary level. (In Swedish.)

(Decimals, Elementary, Recommendations)

Groneman, Nancy J. Business Mathematics Using Electronic Calculators. Englewood Cliffs, New Jersey: Prentice-Hall, 1982.

Calculators take the tediousness out of mathematical applications in business.

(Business, College)

Gross, Ena. Calculator Activities: Numbers Can Be Words. Virginia Mathematics Teacher 9: 14-17; Fall 1982.

Activity sheets are provided which require students to write number sentences and story problems which spell out "calculator words" when the calculator is turned upside down.

(Activities, Elementary (grades 1-6), Junior high (grades 7-8), Worksheets)

Gruber, R. Der Taschenrechner im Unterricht, T. 2 (Calculators in Class, Part 2). Mathematische Unterrichts Praxis 2: 13-25; March 1981.

Two-place operations are considered with calculators having different operating systems. (In German.)

(Calculator logic)

Guillet, N. Calculatrices de Poche (Pocket Calculators). Math Ecole 19: 14-28; May 1980.

The author describes her experiences with calculators in a sixth-grade class. (In French.)

(Elementary (grade 6)

Guillet, N. and Charriere, G. Calculatrices des Poche a l'Ecole Primaire: Qui, mais ... (Calculators in Primary Education: Yes but ...). Math Ecole 18: 27-28; September 1979.

The authors believe pressure from the family and the working world will introduce the calculator in primary education. They describe the advantages of different models of calculators and give nine arguments for the application of calculators. (In French.)

(Elementary, Pros/cons, Recommendations, Selection)

Guinet, R. L'emploi des Calculatrices au Cours Moyen. (The Use of Calculators at Grades 4 and 5.) Grand N 21: 27-43; October 1980.

Examples and hints on the use of calculators for topics such as the Euclidean algorithm are given. (In French.)

(Algorithms, Elementary (grades 4-5)

Hadass, R. and Hadar, N. The Trial-and-Test Method of Solving Story-Problems Using Calculators. Mathematics in School 11: 32-34; January 1982.

This method consists of several guesses of trial-values for the unknown, each followed by testing its validity step-by-step throughout the problem. The purpose is to make the transition from the wording to quantitative terms more concrete.

(Algebra, Problem solving, Secondary, Solution methods)

Hambusch, R. Taschenrechnerkunde (Principles and Use of Hand-Held Calculators). Darmstadt, West Germany: Winklers, 1978.

This book may serve as a basis for using calculators at lower secondary levels and in vocational training. (In German.)

(Business education, Post-secondary, Secondary, Textbook)

Harcharik, Kathleen and Armijo, Moses. Business Computations. Englewood Cliffs, New Jersey: Prentice-Hall, January 1982.

(Business education, Business mathematics, College)

Harling, P. Mechanical Devices (Infant and First School Math, Great Britain). Times Educational Supplement, March 26, 1982.

The role of preprogrammed mechanical devices in the learning process of young schoolchildren in Great Britain is described.

(Elementary, Preprogrammed devices, Status Report)

Hart, K.; Booth, L.; and Turner, A. D. Liaison. Mathematics-Science Links in the Secondary School: Collaboration Between Mathematics and Science Departments. Mathematics in School 11: 2-3; September 1982.

Ideas gleaned from interviews and answers to questionnaires on how science and mathematics departments work together are presented. Many schools mentioned the use of calculators.

(Curriculum, Science, Secondary)

Hauf, A. and Sturm, L. (Eds.). Erfhrungsberichte zur Pilotstudie Programmierbare Taschenrechner im Unterrich. T. 1 and 2 (Reports of Personal Experiences on a Pilot Study of Programmable Calculators in Class. Parts 1 and 2.) Paderborn, West Germany: Forschungs- und Entwicklungszentrum für Objecktivierte Lehr- und Lernverfahren, Institute für Unterrichtswissenschaft/Medieninformation, 1980.

A report on the pilot project "Programmable Calculators in Class" is presented. The main objective of this project was to study possibilities for using programmable calculators in existing lessons. Results for secondary schools are given in Part 1, for technical and business schools in Part 2. (In German.)

(Business education, Evaluation, Programmable calculators, Secondary, Technical occupations)

Hauf, A. and Sturm, L. Programmierbare Taschenrechner im Unterricht (Programmable Pocket-Calculators in the Classroom). Paderborn, West Germany: Forschungs- und Entwicklungszentrum für Objektivierte Lehr- und Lernverfahren, Institute für Unterrichtswissenschaft/Medieninformation, 1980.

This final report of a one-year pilot project using programmable calculators in the classroom addresses many interesting topics concerning curriculum, teaching methods, organization, and finances. (In German.)

(Curriculum, Evaluation, Programmable calculators, Recommendations)

Haviland, R. P. The COMPULATOR Book: Building Super Calculators and Mini Computer Hardware with Calculator Chips. Blue Ridge Summit, Pennsylvania: Tab Books, 1977.

This book explains how to build calculators and minicomputer hardware using calculator chips.

(Building, Related (computers)

Hedrén, Rolf. Miniräknaren på Mellanstadiet (Elementary School Project). Nämnaren 5: 16-19; December 1978.

The author summarizes the results of several different projects, including the ARK, PUMP, and RIMM proposals. (In Swedish.)

(Recommendations, Roles, Status Report)

Heinze, I. Didaktische und methodische Aspekte zur Einfuehrung des Elektronischen Taschenrechners (ETR) in der Hauptschule (On the Introduction of Pocket Calculators in the Secondary Modern School -- Didactical and Methodical Aspects). Ehrenwirth Hauptschulmagazin 6: 7-10; December 1981.

Roles of calculators in secondary schools and methods of introducing them are presented. (In German.)

(Roles, Secondary)

Heller, W. Einige Beispiele für die praktische Schularbeit (Examples for Classroom Work). Report from the Swiss Forum for Mathematical Instruction, Chur, Switzerland 5-7, December 1977.

Exemplary lessons on the use of calculators in elementary schools which were described and discussed during a meeting of Swiss mathematics teachers are condensed in this article. Ideas for the selection of a calculator are included. (In German.)

(Activities, Elementary, Selection)

Henrici, Peter. Essentials of Numerical Analysis with Pocket Calculator Demonstrations. New York: Wiley, 1982.

(College, Numerical analysis)

Hering, E. and Kircherer, H. P. Taschenrechner für Wirtschaft und Finanzen (Calculators for Economics and Finances). Braunschweig, West Germany: Vieweg, 1980.

This workbook for the TI 44 gives programs for problems from economics and finance, including investment calculation and depreciation. (In German.)

(Business, Economics, Finance, Post-secondary, Programmable calculators, Worksheets)

Hess, Adrien I. Mathematics Projects Handbook. Reston, Virginia: National Council of Teachers of Mathematics, 1982. Pp. 30-31. ERIC: SE 036 464.

A small section of the handbook refers to projects in which calculators are incorporated.

(Roles)

Hestenes, Marshall and Hill, Richard. College Algebra with Calculators. Englewood Cliffs, New Jersey: Prentice-Hall, January 1982.

(Algebra, College, Textbook)

Hestenes, Marshall D. and Hill, Richard O. Trigonometry with Calculators. Englewood Cliffs, New Jersey: Prentice-Hall, 1982.

This text presents a standard topic, but with the shift in emphasis that the use of calculators can provide.

(College, Trigonometry)

Hiatt, Art. The Problem Corner. Products of Integers -- Exercises for a Hand Held Calculator. Calculators/Computers 1 (3): November 1977.

The calculator enables students to discover algebraic identities that tedious computation would otherwise obscure.

(Algebra, Junior high, Problem solving)

Higgins, Jon L. and Kirschner, Vicky (Eds.). Calculators, Computers, and Classrooms. Columbus, Ohio: ERIC Clearinghouse for Science, Mathematics and Environmental Education, December 1981. ERIC: ED 215 859.

Calculator articles in this compilation relate to the curriculum, cautions, problem solving, and classroom applications.

(Activities, Course description, Curriculum, Recommendations, References, Related (computers), Research)

Hoffman, Dean and Mohler, Lee. Mathematical Recreations for the Programmable Calculator. Rochelle Park, New Jersey: Hayden Book Company, 1982.

As its title suggests, this book provides a collection of problems designed to teach programming skills and enhance problem-solving ability through mathematical recreations. No particular calculator is required and only a cursory knowledge of algebra is expected.

(Activities, Games, Programmable calculators)

Hohenstein, C. Louis. Using Programmable Calculators for Business. New York: Wiley, January 1982.

(Business education, Business mathematics, Programmable calculators)

Holdsworth, David. Applications of Alphanumeric Calculators. In Computer Series 13. Journal of Chemical Education 59: 604-605; July 1982.

A discussion on the applications of alphanumeric calculators is included, with descriptions of computer programs available for a variety of chemistry-related topics.

(Chemistry, College, Related (computers)

Holdsworth, David K. Mass Spectra of Organic Compounds Containing Bromine and Chlorine. Journal of Chemical Education 59: 780-781; September 1982.

Using programmable calculators, chemistry students can now analyze data from the mass spectrum of an organic compound containing bromine or chlorine to determine its molecular formulas. Listings of two calculator programs (HP-41c calculator) are available from the author.

(Chemistry, College, Programmable calculators)

Holdsworth, D. K. Using a Programmable Calculator for the Rapid Plotting of Graphs in Science and Mathematics. School Science Review 62: 525-529; March 1981.

Specific suggestions are given for using calculators to plot graphs.

(College, Graphs, Programmable calculators, Science, Secondary)

Hony, B. V. Calculator Mathematics for 'O' Level. Huddersfield, England: Schofield, 1979.

This book uses the calculator to teach basic arithmetic and algebraic skills.

(Algebra, Mixed operations, Secondary)

House, J. E., Jr. Calculator Program for Analysis of a Complex by Job's Method. In Computer Series 25. Journal of Chemical Education 59: 132; February 1982.

A program is described for a TI 59 programmable calculator which can determine the maximum amount of complex in a solution. This provides students and teachers of inorganic chemistry or instrumental analysis with a time-saving alternative to more usual techniques.

(Chemistry, College, Programmable calculators)

House, J. E. Calculator Programs for Analyzing TGA Data. In Computer Series 29. Journal of Chemical Education 59: 516; June 1982.

A program useful in instrumental analysis, solid state chemistry, physical chemistry, polymer chemistry, and other applied laboratory areas using thermal analysis is described.

(Chemistry, College, Programmable calculators)

Houben, J. P. Les Calculatrices (Pocket Calculator). Mathématique et Pedagogie 6: 77-89; September-October 1980.

The author describes some uses of elementary, scientific, and programmable calculators. Applications, examples, and programs are presented for each. (In French.)

(Activities, Four-function calculators, Programmable calculators, Scientific calculators)

Huff, Darrell. Calcu-Letter. Popular Science 220: 44; January 1982. 220: 24; March 1982. 220: 70-71; May 1982.

This bi-monthly column presents problems and suggestions about calculator use.

(Activities)

Hyatt, Herman R. Trigonometry, A Calculator Approach. New York: Wiley, 1981.

This text illustrates that a standard treatment of trigonometry can be greatly enhanced through the use of calcualtors.

(Trigonometry)

Hyatt, Herman R. and Small, Laurence. Trigonometry: A Calculator Approach. New York, New York: Wiley, 1982.

As its title suggests, this text presents trigonometry with an emphasis on those topics most readily adaptable to calculator use. Prerequisite topics in coordinate systems, algebra, and geometry (also using a calculator approach) are discussed in the appendixes.

(Secondary, Textbook, Trigonometry)

Hyde, Kendell. Compound Interest and e. Calculators/Computers 1 (3): November 1977.

Students are introduced to the number e through computing compound interest at different intervals.

(Algebra, College, Finance, Logarithms)

Ingle, R. B. and Turner, A. D. Mathematics-Science Links in the Secondary School: A Select Bibliography. Mathematics in School 11: 22-26; November 1982.

One brief section of this bibliography lists 10 references on the use of calculators in science lessons.

(References)

Johnson, Alonzo F. The t in I = Prt. Mathematics Teacher 75: 595-597; October 1982.

Discrepancies between student calculation and an actual bank statement led the author to question and eventually change his bank's method of charging interest. The discussion provided ample calculator activity for the students.

(Consumer application, Finance)

Kahan, W. M. Personal Calculator Has Key to Solve Any Equation f (x) = 0. Hewlett-Packard Journal 30: 20-26; December 1979.

The HP 34C calculator has a SOLVE key which automatically calculates the roots of an arbitrary equation f (x) = 0 from one or two initial guesses. This method is discussed in some detail and its quality compared to a number of alternative methods.

(Algebra, Calculator keys)

Kahlig, P. Mathematische Routinen der Physik, Chemie und Technik für AOS-Rechner. T. 2 (Mathematical Routines for AOS-calculators Used in Physics, Chemistry and Technology. Part 2). Branschweig, West Germany: Vieweg, 1980.

Fourteen elaborate programs for 21 frequently used special functions in physics, chemistry, and technology are explained. (In German.)

(Chemistry, Physics, Programmable calculators)

Keerutaja, H. Application of Microcalculators at Schools. In Modern Problems in Teaching Mathematics. Esthonia, USSR: Tallinn, 1979. Page 116.

The author describes the use of calculators in various Russian mathematics classrooms. (In Russian.)

(Pros/cons, Recommendations, Status report)

Kennedy, John H. Balancing Chemical Equations with a Calculator. Journal of Chemical Education 59: 523-524; June 1982.

The availability of calculators that can generate matrix coefficients enables students to use a rapid method to balance chemical equations through the use of sets of simultaneous equations.

(Chemistry, College, Programmable calcualtors)

Kenner, Martin. Teaching Decimal Math with Calculators. Fairborn, Ohio: National Middle School Association, 1981. ERIC: ED 214 290.

An analysis of this 8-day study indicates that calculators neither promoted nor hampered student performance on decimal operations and that the computational skills of the students were not dependent on the machines.

(Achievement, Decimals, Junior high (grades 7, 8), Research)

Kidd, N. A. Simulation of Population Process with a Programmable Pocket Calculator. Journal of Biological Education 13: 284-290; 1979.

Use of the programmable calculator in a simulation activity is illustrated.

(Biology, College, Programmable calculators, Secondary)

Killingbeck, J. P. The Creative Use of Calculators. Hammondsworth, England: Penguin Books, 1981.

The design and operation of calculators, problems to illustrate the flexibility of all types of problems, and varied applications are included in this book.

(Activities, Consumer applications, Finance)

Kittler, H. TR-Testaufgaben (Calculator Test Problems). Lehrmittel Aktuell 8: 40-41; April 1982.

Characteristics of different calculators are shown by using test problems. About 200 test exercises with exact descriptions are given to help readers become better acquainted with algebraic notation calculators. (In German.)

(Selection)

Kittler, H. TR-Testaufgaben: Konstantenrechnung (Calculator Test Problems - Calculating with Constants). Lehrmittel Aktuell 8: 35-36; June 1982.

Test problems show the different characteristics of different calculators. Around 200 test exercises with exact descriptions are given to help the reader become better acquainted with the calculators available to him or her. (In German.)

(Calculator logic, Selection)

Knopf, P. Forschungs- und Entwicklungsprojekte zum Einsatz von Taschenrechnern im Uterricht (Research and Development Projects Concerning the Introduction of Pocket Calculating Machines at School). Bildungsforsch. Bildungsprax. 2: 39-57; 1980.

Fifty-two research and development projects are summarized. (In German.)

(Research (summary))

Kolde, R. and Normak, P. The Training of Teachers to Computational Mathematics at Tallinnas Teachers Training College. In Modern Problems in Teaching Mathematics. Esthonia, USSR: Tallinn, 1979. Page 115.

The authors describe a mathematics teacher-training program which emphasizes work in computational mathematics. (In Russian.)

(Course description, Recommendations, Teachers (preservice))

Krause, Marina C. Clock Talk. Calculators/Computers 1 (3): November 1977.

Through experimentation with calculators, students determine which times on a digital clock form "clock words" when read upside down. Practice reading face clocks and rewriting the time as a digital display is included.

(Activities, Elementary (grades 3-5), Games, Time)

Kravitz, Sidney. Alternatives on a Hand-Held Calculator. Two-Year College Mathematics Journal 13: 182; September 1982.

Two puzzles (to be solved on a scientific calculator) and their solutions are presented.

(Functions, Games, Scientific calculators)

Kreul, H. Programmierbare Taschenrechner (Programmable Pocket Calculators). Thun, Switzerland: Deutsch, 1980.

This book shows how programmable calculators operate and presents the foundations of programming. (In German.)

(Programmable calculators, Secondary (grades 10-12))

Krist, Betty J. Uses of Calculators in Secondary Mathematics. Iowa Council of Teachers of Mathematics 11: 29-34; Fall 1982.

The author identifies seven general categories of activities where the calculator serves as an aid to secondary instruction. Brief descriptions of specific examples belonging to each category are included.

(Activities, Problem solving, Programmable calculators, Recommendations, Secondary)

Kristel, Theo. Rekenen met Onnauwkeurige Getallen. Euclides 54: 361-366; May 1979.

Decimal approximation to square roots, scientific notation, and error estimates are among the topics included. (In Dutch.)

(Decimals, Roots, Significant figures)

Kuendig, A. Basteln mit dem Taschenrechner (Rigging with the Pocket-Calculator). Neue Schulpraxis 49: 29-32; December 1979.

The reader should be induced by the detailed description to use worn-out calculators in order to become acquainted with their way to functioning and to create possible extended functions. (In German.)

(Building)

Lappan, Glenda; Phillips, Elizabeth; and Winter, M. J. Powers and Patterns: Problem Solving with Calculators. Arithmetic Teacher 30: 42-44; October 1982.

The authors describe a sequence of calculator activities designed to help middle-school students explore powers of numbers and patterns within the powers.

(Elementary, Junior high, Pattern searches, Powers, Problem solving)

Lartigue, R. and Delepoulle, Y. Formidable ma calculatrice: Conforme aux programmes de 6e et de 5e. (Wonderful - Pocket Calculator: According to the Programme for Grades 8 and 9). Paris, France: Magnard, 1980.

This book is an introduction to the use of calculators in grades 8 and 9. (In French.)

(Activities, Junior high (grades 8-9))

Lartigue, R. and Delepoulle, Y. Formidable ma calculatrice: Conforme aux programmes de 4e et de 3e. (Wonderful - My Pocket Calculator: According to the Programme for Grades 6 and 7). Paris, France: Magnard, 1980.

This book is an introduction to the use of calculators in grades 6 and 7. (In French.)

(Activities, Elementary (grade 6), Junior high (grade 7))

Laurend V. The Experience of Microcalculator Application. In Modern Problems in Teaching Mathematics. Esthonia, USSR: Tallinn, 1979. Pg. 117-118.

This article considers the pros and cons of calculator use in Russian classrooms. (In Russian.)

(Recommendations, Secondary)

Leechford, Sandra and Rice, Dale R. The Effect of a Calculator-Based Curriculum on Sixth Grade Students' Achievement in Mathematics. School Science and Mathematics 82: 576-580; November 1982.

The results of this study suggest that the use of a calculator-based curriculum can have a positive effect on students' achievement in problem solving and computation. A full description of the experiment including suggestions for further investigation are included.

(Curriculum, Elementary (grade 6), Gender, Research, Testing)

Lehmann, V. Methodischer Einsatz des pTR im Analysis-Unterricht (Methodical Use of Programmable Pocket Calculators in Calculus Teaching). Paderborn, West Germany: Forschungs- und Entwicklungszentrum für Objektivierte und Lernverfahren, Institute für Unterrichtswissenschaft/Medieninformation, 1979.

A method of teaching calculus with the use of a programmable calculator is presented. (In German.)

(Calculus, College, Course description, Programmable calculators)

Lehmann, V. Methodischer Einsatz programmierbaren Taschenrechner in Wahrscheinlichkeitsrechnung und Statistik (Methodical Use of Programmable Pocket Calculators in the Theory of Probability and Statistics). Paper presented at the Federal Meeting on Didactics of Mathematics, Dortmund, West Germany, 4-7 March 1980.

Experiences in the theory of probability and in statistics using TI 58/59 programmable calculators are described. (In German.)

(Probability, Programmable calculators, Secondary (grade 12), Statistics)

Leibensperger, Philip W. Role of the Calculator in the Mathematics Classroom. Virginia Mathematics Teacher 8: 21-25; Spring 1982.

The results of several programs designed to introduce calculators to the elementary curriculum are described. An instructional aid, the calculator can help reinforce mathematical concepts, alleviate computational frustration, and improve problem-solving performance.

(Recommendations, Research (summary), Roles)

Levy, Lawrence S. Trigonometry with Calculators. New York: Macmillan, 1983.

(Secondary, Textbook, Trigonometry)

Lindahl, Göran. Miniräknare i Skolan (Calculators in Schools). Nämnaren 5: 3-4; December 1978.

A brief overview of the development of calculators and their use in the classroom is given. (In Swedish.)

(Recommendations, Status report)

Lindner, H. Propaedeutische Informatik mit programmierbaren Taschenrechnern (Informal Computer Science with Programmable Calculators). Paper presented at MNU General Meeting, München, West Germany, April 1980.

Exercises with programmable calculators for computer science are described briefly. (In German.)

(Programmable calculators)

Loethe, H. and Mueller, K. P. Taschenrechner (Pocket Calculators). Stuttgart, West Germany: Teubner, 1979.

This textbook for preservice and in-service teachers discusses the characteristics and functions of calculators, applications at school, and appropriate changes in the mathematics curriculum. (In German.)

(Teachers (preservice, in-service), Textbook)

Lopez, Antonio M., Jr. and Hymel, Glenn M. The Effect of Computer Instruction on Computer Literacy in a Mathematics Teacher Development Program. Paper presented at the Annual Meeting of the Mid-South Educational Research Association. Lexington, Kentucky. November 12, 1981. ERIC: SE 039 479.

This paper describes the summer portion of the Mathematics Teacher Development Program, funded by the National Science Foundation, which was found to have a positive effect on the computer literacy of the participating teachers. One of the topics discussed was the comparison of computers with calculators.

(Attitudes, Related (computer), Research)

Ludwig, H. J. Programmieren von Taschenrechnern. Bd. 5 (The Programming Calculators. Vol. 5). Braunschweig, West Germany: Vieweg, 1979.

This book is designed for students and teachers of upper secondary levels and for interested laymen. It emphasizes solving problems with a small amount of time and memory space and with high effectiveness and clarity. (In German.)

(Programmable calculators, Secondary (grades 10-12), Textbook)

Maletsky, Evan M.; Hirsch, Christian; and Yates, Daniel. The Golden Ratio in Geometry. Mathematics Teacher 75: 672-676; November 1982.

The golden ratio is approximated algebraically as the ratio of consecutive Fibonacci numbers and geometrically as the ratio of the lengths of sides of particular rectangles. Three worksheets, one of which calls for a calculator, are included.

(Activities, Geometry, Junior high, Measurement, Ratios, Secondary)

Malinka, Robert M. Middle School Research. Selected Studies 1977-1979 III. National Middle School Association, Fairborn, Ohio, 1981. ERIC: ED 214 283.

Eight studies are included, covering a variety of concerns in middle school education. Among these is a research report on teaching decimals with calculators.

(Decimals, Elementary (middle school), Junior high, Research)

May, Lola. The Calculator's Place in the Classroom. Early Years 12: 23-24; May 1982.

The author stresses that it is the responsibility of teachers to show pupils when and how to use calculators to the best advantage. Specific ideas for kindergarten through the fourth grade are presented.

(Addition, Elementary, Recommendations, Subtraction)

Mayer, Richard E. Contributions of Cognitive Science and Related Research on Learning to the Design of Computer Literacy Curricula. Report No. 81-1. Santa Barbara, California: University of California, Department of Psychology, December 1980. ERIC: ED 207 551.

This paper is a review of the research on techniques for increasing the novice's understanding of computers and computer programming. Intuitions that are established working with calculators may be important for later learning of programming languages.

(Related (computers), Research

Mayer, R. E. and Bayman, P. Psychology of Calculator Languages: A Framework for Describing Differences in Users' Knowldege. Communication of the ACM 24: 511-520; August 1981.

A framework is presented for describing novices' and experts' knowledge of how a simple four-function calculator operates.

(Algorithms, Calculator logic, Four-function calculators, Functions)

Meehan, James R. How to Use the Calculator and Comptometer. New York: McGraw-Hill, 1964.

This reference serves as a user's guide to some of the earlier makes of calculators.

(Calculator keys, Calculator logic, Calculator memory, Post-secondary, Related (technology))

Meierhoefer, B. Adler L 812, ein elektronischer Taschenrechner der dritten Generation (Adler L 812, An Electronic Pocket Calculator of the Third Generation). Ehrenwirth Hauptschulmag 5: 55-56; January 1980.

The Adler L 812 model calculator is described. It is being used in secondary and vocational schools. (In German.)

(Marketing)

Meissner, H. Zur Problematik des Taschenrechners im Mathematikunterricht (On the Use of Calculators in the Mathematics Classroom). Paper presented at the OeMG Advanced Teachers Training Seminars in Klagenfurt and Leoben, Austria, September 1978 and September 1979.

Thirty types of problems at elementary and lower secondary levels are analyzed, demonstrating that calculators can be used to revise the present curricula. (In German.)

(Curriculum, Elementary, Recommendations, Secondary)

Mendoza, Eric. The Effect of Electronic Pocket Calculators of Science Teaching. In Co-Operation Between Science Teachers and Mathematics Teachers. Materialien und Studien Band 16. Bielefeld, West Germany: Universität Bielefeld, Institut für Didaktik der Mathematik, 1978. Pg. 146-150.

The role of the calculator in the science classroom is discussed. (In German.)

(Recommendations, Research (survey), Science, Secondary)

Meylan, R.; et al. Cruppenberichte (Group reports). Reports from the Swiss Forum for Mathematical Instruction, Chur, Switzerland, 5-7 December 1977.

Reports from eight working groups of Swiss mathematics teachers discussing the use of calculators in elementary schools are compiled. Selection of subject matter, methods, teacher training, and organization are some of the questions discussed. (In German.)

(Elementary, Pros/cons, Recommendations)

Michel, F. Emploi des Calculatrices Programmables (Use of Programmable Calculators). Paper presented at the Seminar on Calculators in School Teaching, Luxembourg, Luxembourg, May-June 1978.

Objectives and experiences with the use of programmable calculators are given for students aged 16 to 18. (In French.)

(Programmable calculators, Secondary)

Miller, John D. Calculators in Elementary Mathematics Instruction: An Information Exchange. Berkeley, California: University of California, August 1979 and May 1981. ERIC: SE 035 873 and SE 035 874.

In separate reports, the author describes the 1978 and 1979 California statewide information exchange workshops which focused on calculator-assisted mathematics materials and teaching ideas and strategies. Included in the reports are the agenda followed, games and activities used, and summaries of discussion group topics.

(Activities, Elementary (grades 1-6), Games, Junior high (grades 7-8), Recommendations, Worksheets)

Miller, R. M. and Coversto, R. A. Controlling a Graphics Plotter with a Hand-Held Programmable Calculator. Hewlett-Packard Journal 33: 16; 1982.

(Programmable calculators, Related (computers))

Mitchell, E. E. Frequency-Response Calculations with a Programmable Calculator. CoED 1: 8-11; May-June 1981.

A program written for a programmable calculator that computes the frequency response of linear systems is presented.

(College, Programmable calculators, Statistics)

Mǒls, M. On an Approximate Calculation of the Limit and the Derivative of the Function by Use of the Programmable Microcalculator. In Modern Problems in Teaching Mathematics. Esthonia, USSR: Tallinn, 1979. Pg. 112-115.

The author approximates the limits and derivatives of common functions on a programmable calculator.

(Calculus, College, Derivatives, High school, Programmable calculators)

Moore, Bobbie Henderson. The Effect of the Hand-Held Electronic Calculator on Attitude Toward Mathematics and Mathematics Achievement of Third-Grade Learners. (University of San Francisco, 1982.) Dissertation Abstracts International 43A: 1457; November 1982.

Ninety third-grade students participated in this study of the relationship between student attitude and achievement and the use of calculators. Students receiving calculator instruction had less positive attitudes toward mathematics but significantly higher mean achievement than the control groups.

(Achievement, Attitudes, Elementary, Research)

Moser, James M. Dear Kathy's Teacher. Arithmetic Teacher 29: 26; April 1982.

The accessibility of calculators causes the author to question the role of routine long division problems in mathematics instruction. To know when to divide is more important than to know how to divide without being able to apply that skill.

(Curriculum, Division, Elementary, Recommendations)

Moursund, Dave. Aren't We All Handicapped? The Computing Teacher 10: 3-4; February 1983.

In a brief editorial, the author recalls a project involving "talking calculators" designed for blind students. The use of these special calculators enabled the students to develop mental arithmetic and estimation skills while their sighted counterparts were learning only paper-and-pencil-assisted calculation methods. The author suggests that a broader definition of "handicapping condition" may be one way to force schools to incorporate computers into the curriculum.

(Curriculum, Handicapped, Recommendations, Related)

Moursund, David. School Administrator's Introduction to Instructional Use of Computers. La Grande, Oregon: International Council for Computers in Education, Eastern Oregon State College, 1980.

This booklet is designed for school administrators and board members who have had little or no experience with calculators or computers but who are interested in how they can or should be used in the schools. The question/answer format is followed by a guide to periodical literature and a brief glossary.

(Curriculum, Recommendations, Related (computers)

Moursund, David. The Unchanging Conventional Curriculum. Computing Teacher 10: 3-4; December 1982.

The author notes parallels between the arguments advanced against calculators a few years ago and current arguments against computers. The curricular revisions that calculator use was once expected to prompt may now come about as computers play an increasing role in the classroom.

(Curriculum, Recommendations, Related (computers), Status report)

Mueller, K. P. Beispiele für einen effektiven Einstaz von Taschenrechnern (Examples for the Effective Use of Pocket Calculators). Mathematische Unterrichtspraxis 2: 21-18; No. 1, 1981.

Many examples demonstrate ways pupils can learn the limits and strengths of calculator use. (In German.)

(Roles)

Mueller, K. P. Sachrechnen mit dem Taschenrechner (Real-life-Arithmetic with the Pocket Calculator (7-9)). Mathematische Unterrichtspraxis 2: 25-32; No. 2, 1981.

Numerous examples of the efficient use of calculators in real-life arithmetic in junior high are presented. (In German.)

(Activities, Junior high)

Mullish, Henry and Kestenbaum, Richard. Financial Analysis by Calculator: Problem-Solving Techniques with Applications. Englewood Cliffs, New Jersey: Prentice-Hall, 1982.

Problems in finance are greatly simplified through the use of calculators and effective problem-solving strategies.

(Business mathematics, Finance, Problem-solving)

Musch, B. E.; Wong, J. J.; and Conklin, D. R. Powerful Personal Calculator System Sets. Hewlett-Packard Journal 31: 3-6; March 1980.

The HP-41C calculator is described. Its features include over 130 preprogrammed functions and an alphanumeric keyboard.

(Marketing, Post-secondary, Preprogrammed devices, Programmable calculators)

Nachtergaele, J. Der Gebrauch von Taschenrechnen in der Sekundarstufe (The Use of Pocket-Calculators in Secondary Education: Functions, Equations, Inequalities). Paper presented at the Seminar on Calculators in School Teaching, Luxembourg, Luxembourg, May-June 1978.

The author tries to find out if calculators are a real aid for students aged 12 to 18 in the mathematics classroom. (In German.)

(Junior high (grades 7-9), Secondary (grades 10-12))

Nahrstedt, H. Statik, Kinematik, Kinetik für AOS-Rechner (Statics, Kinematics, Kinetics for AOS-calculators). Braunschweig, West Germany: Vieweg, 1980.

This book is addressed to students, engineering, technicians, and teachers of high school physics. Basic knowledge in programming pocket calculators, especially the TI 58/59, is needed. (In German.)

(College, Engineering, Physics, Programmable calcualtors)

Nahrstedt, H. Festigkeitslehre für AOS-Rechner (TI 59) (Strength Theory for AOS-computers (TI 59). Braunschweig, West Germany: Vieweg, 1981.

Volume 7 of the series "Application of Programmable Pocket Calculators" presents 42 application-centered programs for the strength theory for the model TI 59. (In German.)

(Engineering, Programmable calculators)

Neill, H. Calculating Without a Scientific Calculator. Mathematical Spectrum 12: 65-69; 1979/80.

Methods of evaluating functions such as log x, sin x, and cos x without a scientific calculator are described.

(Trigonometry)

Neubauer, Steven C. The Use of Hand-Held Calculators in Schools: A Review. Richton Park, Illinois, 1982. ERIC: ED 220 272.

The author reviews a number of studies from which he draws the following conclusions: 1) use of calculators prior to the junior high school level is ill-advised since students are still learning basics; 2) below average students apparently do not profit from calculators as a learning aid; 3) the use of calculators can improve a student's ability to plan logically an approach to the solution of a problem.

(Research (review))

Nilsson, Bengt. Miniräknaren som Kommunikationsinstrument (Calculators as a Communication Instrument). Nämnaren 5: 11-13; December 1978.

The capacity of calculators to communicate subtle mathematical concepts is discussed. (In Swedish.)

(Recommendations, Roles)

Noack, S. Statistische Auswertung von Mess- und Versuchsdaten mit Taschenrechner und Tischcomputer (Statistical Evaluation of Measuring-results and Experimental Data with the Pocket Calculator and Desk Computer). Berlin, West Germany: De Gruyter, 1980.

This comprehensive book provides instruction for scientists and engineers on the application of statistical methods. (In German.)

(Engineers, Post-secondary, Programmable calculators, Related (computers) Statistics)

Obermeyer, Dean D. Another Look at the Quadratic Formula. Mathematics Teacher 75: 146-152; February 1982.

The author suggests that an alternate method of deriving the quadratic formula (one which avoids fractions until the last step) is useful in solving quadratic congruences modulo p. The calculator is used to convert the decimal part of quotients into whole number remainders; then BASIC programs generate 1) multiplication tables for integers modulo k and 2) the squares and inverses of integers modulo k.

(Algebra, Algorithms, Secondary)

O'Brien, Thomas C. Learning and Context: An Interview with A. I. Weinzweig, Edwardsville, Illinois: Southern Illinois University, 1981. ERIC: ED 214 758.

Weinzweig makes a distinction between training students and education. He believes that American education offers little more than training for a world that no longer exists. The failure of schools to make productive use of calculators helps to illustrate his point.

(Problem solving, Recommendations)

Okomo, Walter O. Calculators in the Mathematics Classroom: A Selected Bibliography. Newark, New Jersey: Rutgers University, Department of Academic Foundations, 1983.

Uses of calculators at secondary and college levels are included among these references, with an emphasis on research needs.

(College, References, Research, Secondary)

Olson, Melfried and Sindt, Vincent G. Examining Rates of Inflation and Consumption. Mathematics Teacher 75: 472-473; September 1982.

Three worksheets are provided (on inflation rates, coal consumption, and bacteria/finance) and the calculator is used to complete tables which illustrate the concepts.

(Activities, Economics, Environmental, Finance, Secondary)

Onnis, H. The Application of Microcalculators at the Kingissep Secondary Night School. In Modern Problems in Teaching Mathematics. Esthonia, USSR: Tallinn, 1979. Pg. 119-120.

The article describes a night school mathematics program which makes use of calculators. (In Russian.)

(Recommendations, Secondary)

Ornstein, Allan C. Innovation and Change: Yesterday and Today. High School Journal 65: 279-286; May 1982.

The use of calculators is among the curriculum innovations discussed.

(Curriculum, Recommendations)

Padberg, F. Kreuzwortraetsel und Taschenrechner - ein Beispiel (Crossword Puzzles and Calculators - an Example). Praxis der Mathematik 22: 171-173; June 1980.

Two crossword puzzles are given which can be easily and diversely varied, and can be used during the introduction to using calculators. (In German.)

(Games, Worksheets)

Paini, A. Uso delle calcolatrici tascabili nella scuola media superiore (Using Pocket-Calculators in the Upper Secondary). L'Insegnamento della Mathematica e delle Scienze Integrate 3: 59-69; February 1980.

A way is proposed to use four-function calculators with memory to find n-th root of a number and to solve algebraic equations. Programmable calculators are then used for the solution of standard geometrical problems. (In Italian.)

(Algebra, Four-function calculators, Geometry, Programmable calculators, Secondary (grades 10-12))

Papritan, James C. Pocket Calculators in Vocational Agriculture. Paper presented at Central States Teacher Educator's Seminar, 1982.

Strategies for incorporating the calculator into a vocational agriculture curriculum are presented. A sample outline for determining volume is included.

(Activities, Recommendations, Vocational agriculture)

Peterson, Ivars. Can You Count on Your Computer? Science News 122: 72-75; Noted in Mathematics Teacher 76: 75; January 1983.

Common calculator and computer errors, due to the internal working of the machines, are identified and discussed.

Calculator keys, Calculator logic, Calculator memory, Related (computers), Secondary)

Polisky, Mildred K. and Meehan, James Robert. Solving Business Problems on the Electronic Calculator (2nd Ed.). New York: Gregg Division, McGraw-Hill, C1983.

How to solve business problems with a calculator is presented in this text.

(Business)

Pluess, A. Das 'Innenleben' eines Taschenrechners (A Calculator's Operating Principles). Report from the Swiss Forum for Mathematical Instruction, Chur, Switzerland, 5-7 December 1977.

Some hardware aspects and operating principles of calculators are summarized in layman's terms. (In German.)

(Status report)

Repetto, I. Un'esperienza di studio dell'uso dei calcolatori tascabili (CT) in terza media (An Experience of Studying the Use of Pocket-Calculators in the 8th Year of School). L'Insegnamento della Matematica e delle Scienze Integrate 4: 50-65; February 1981.

Described is an experiment on estimation with 11 eighth-grade classes. (In Italian.)

(Estimation, Junior high (grade 8), Research)

Ribera, Gilbert J. Machine Calculation for Business and Personal Use. San Francisco: Holden-Day, 1979.

The role of calculating devices in both commercial and private realms is outlined.

(Business, Consumer applications, Post-secondary)

Robitaille, David E. An Investigation of Some Numerical Properties. Arithmetic Teacher 29: 13-15; May 1982.

Calculators are used to check for examples and counter-examples as students explore commutative properties and transposition-of-digits properties.

(Addition, Elementary, Junior high, Multiplication, Properties)

Romanovskis, T. Playing with the Microcalculator. Zvaigžnotā Debess, Ruden, 1979; Ziema, 1979/1980; Vasara, 1980.

A variety of calculator-related activities are presented. (In Russian.)

(Activities, Recommendations)

Romanovski, T. Skaitļotājs -- Darbā, Mācībās, Spēlēs. Riga, USSR: Zvaigzne, 1982.

The initial chapters introduce scientific calculators and include a few recreational activities (crossword puzzles). The bulk of the book deals with specific mathematical topics which can be investigated or reinforced through the use of programmable calculators. Detailed flow charts and step-by-step keystroke sequences of calculator programs are included for many topics. (In Russian.)

(Calculator keys, Calculator logic, Calculator memory, College, Flow charts, Programmable calculators, Scientific calculators, Secondary)

Russell, Barbara E. Calculators in the Special Education Classroom. Directive Teacher 4: 6, 11; Winter/Spring 1982.

Mildly mentally handicapped children learned the operation of the calculator with minimal instruction. The motivation and interest level was very high; and the accuracy of most students increased. Specific problems were encountered with clearing the calculator and estimation.

(Elementary (ages 10-12), Handicapped (mentally), Research)

Ryder, Donald Gowen. The Effect of Hand-Held Calculators and Assigned Homework on the Achievement, Attitude, and Persistence of Remedial Algebra Students in a Small, Four-Year College. (Georgia State University - College of Education, 1982.) Dissertation Abstracts International 43A: 711; September 1982.

Although no significant differences in achievement, attitude toward mathematics, or persistence were found when comparing calculator and noncalculator groups, results from a student questionnare indicated that calculators are a good motivating device and assigned homework is necessary.

(Algebra, Attitudes, College, Remedial, Research)

Saks, Mark. The Calculator Cookbook: Maximizing the Computational Power of Your Hand-Held Calculator. Englewood Cliffs, New Jersey: Prentice-Hall, May 1982.

(Algorithms, Calculator keys, Calculator logic, Calculator memory)

Salisbury, David F. Money Matters. Englewood Cliffs, New Jersey: Prentice-Hall, 1982.

According to the author, even the simplest calculator, when used with the proper software, is sufficient to simplify relatively complicated problems in personal finance. This book provides the necessary software.

(Finance, Four-function calculators, Post-secondary, Selection)

Salmond, L. Report of Hand Held Calculator Committee. Paper presented at the American Mathematical Association of Two-Year Colleges, Houston, Texas, 10-14 October 1978.

A 12-item questionnaire was distributed to 310 instructors. The questionnaire and a statistical analysis are presented.

(College, Research (survey))

Savage, Michael. Design Optimization Programmable Calculators Versus Campus Computers. CoED 2: 12-15; March-April 1982.

A hypothetical design optimization problem and technical information on the three design parameters are presented. Although this nested iteration problem can be solved on a computer (flow diagram provided), this article suggests that calculators can be used to perform the same iterations.

(College, Engineering, Programmable calculators)

Schaafsma, Sjoerd. Mijn Ervaringen in een Leao. Euclides 54: 356-358; May 1979.

Some of the drawbacks of calculators, both external (e.g., dependence on batteries) and internal (e.g., round-off error) are mentioned. Also included is a note on those numerals which double as letters when the calculator is read upside down. (In Dutch.)

(Calculator keys, Pros/cons)

Schanz, R. and Weber, F. (Eds.). Unterichtshilfen zum Lehrplanentwurf Mathematik Sek. I (Teaching Aids for the Syllabus Outline for Lower Level I Mathematics). Mainz, West Germany: Institut für Lehrefort- und -weiterbildung, August 1980.

This is a syllabus outline of teaching aids for lower level 1 mathematics. (In German.)

(Course description, Secondary)

Schauer, H. and Barta, G. Methoden der Programmerstellung für Tisch- und Taschenrechner (Methods for Programming Desk and Hand-Held Calculators). Vienna, Austria: Springer, 1979.

This introduction to the programming of calculators includes the use of recent software techniques. Examples refer to the fields of numerical mathematics (mainly roots of functions), engineering, business, and statistics. (In German.)

(College, Desk calculators, Programmable calculators, Secondary)

Schmitt, H. Der elektronische Taschenrechner im Mathematikunterricht der Hauptschule. T. 1 (Calculators in Mathematics Lessons in Grades 5-9. Part 1). Scholle 50: 386-397; June 1982.

The first part of the article deals with the problem of using calculators in grades 5-9, using investigation results to show that calculation scores can be improved. The second section discusses what the calculator for this level should be like. (In German.)

(Elementary (grades 5-6), Junior high (grades 7-9), Pros/cons, Research, Selection)

Schmitt, H. Der elektronische Taschernrechner im Mathematikunterricht der Hauptschule. T. 2 (Using Calculators in Secondary Modern Schools. Part 2). Scholle 50: 451-459; July 1982.

Activities are given for using the calculator to teach fractions, percents, and real-life problems. (In German.)

(Activities, Elementary (grades 5-6), Fractions, Junior high (grades 7-9), Percent, Problem solving)

Schruff, D. and Holler, H. Der programmierbare Taschenrechner im Mathematikunterricht der Sekundarstufen I und II (The Programmable Pocket Calculator in the Maths Classroom at Secondary Level). In Zum Einsatz von Taschenrechnern im Unterricht (On the Use of Pocket Calculators in the Classroom) (H. Holler, Ed.). Dusseldorf, West Germany: Schwann, 1980.

An introduction is given to the use of programmable calculators (TI 58/59). Linear programs, branches, loops, subroutines, and indirect storage addressing are discussed. (In German.)

(Programmable calculators, Secondary)

Schubart, H. Programmierbare elektronische Taschenrechner (Kleincomputer) (Programmable Electronic Pocket Calculators (Mini-computers)). Karlsruher Pädagogische Beiträge (1): 70-75; 1979.

This is a brief presentation of the development of programmable calculators and their use in class and in teacher training, together with advice on the use of special calculators. (In German.)

(Programmable calculators)

Schwritz, W. Programmierbare Taschenrechner im Mathematikunterricht der Sekundarstufe I (Programmable Pocket Calculators Used in Mathematics Instruction Provided at Lower Secondary Level). Neue Unterrichtspraxis 13: 120-127; March 1980.

The author advocates the use of programmable pocket calculators in mathematics instruction at lower secondary levels. He compares the programmable calculator, the other calculator, and calculation without any teaching aids. (In German.)

(Junior high (grades 7-9), Programmable calculators)

Sconyers, James M. Spacing Radicals. Mathematics Teacher 75: 130, 158; February 1982.

The use of a calculator or computer enables students to overcome a common misconception concerning the square roots of successive integers through empirical investigation. The brief analytic argument should be appealing to students who arrived at the same result through cumbersome calculations.

(Integers, Problem solving, Roots, Secondary)

Scott, Douglas E. How Many Digits Do You Want? ... On Your Calculator or Computer. Calculators/Computers 1: November 1977.

A method (one for calculators, one for computers) of carrying out division to any number of decimal places is outlined. A similar procedure for multiplication is available upon request from the author.

(Division, Related (computers), Secondary, Significant figures)

Seber, Robert E. Systems of Linear Equations with Mini-calculators or Computers. School Science and Mathematics 81: 512-516; October 1981.

A successive approximation method for solving a system of linear equations appropriate for use with calculators or computers is presented. Included are curricular implications.

(Algebra, Curriculum, Secondary (grade 9), Solution methods)

Seckler, Bernard. The Programmable Hand Calculator: A Teacher's Tool for Mathematics Classroom Lectures. Manhasset, New York: Sigma Press, 1981.

Program listings (for TI 58C and HP 29C calculators), comments, and numerical examples designed to supplement lectures in calculus, probability/statistics, differential equations, and linear algebra are included.

(Calculus, College, Probability, Programmable calculators, Programming, Secondary, Statistics)

Segal, Arthur C. Motivating e by Calculator. Two-Year College Mathematics Journal 13: 171; September 1982.

The author prepares students for a formal definition of the number e through a calculator-based, intuitive approach to the derivative of e.

(Calculus, College, Derivatives)

Seymour, William O. Use Your Pocket Calculator to Scale Photographs. Quill and Scroll 56: 16-18; April-May 1982.

The use of calculators greatly simplifies the calculation required to scale photographs.

(Secondary, Technical occupations)

Sharp, Vicki F. How to Solve Statistical Problems with Your Pocket Calculator. Blue Ridge Summit, Pennsylvania: Tab Books, 1982.

The author presents calculator algorithms designed to handle standard problems in statistics.

(Post-secondary, Scientific calculators, Statistics)

Shkil, N. and Slepkan, Z. On the Experiment of Microcalculator Use in Mathematics Teaching in the Ukrainian SSR. In Modern Problems in Teaching Mathematics. Esthonia, USSR: Tallinn, 1979. Pg. 101-105.

The results of experimental calculator use with Ukrainian schoolchildren are summarized. (In Russian.)

(Recommendations, Research (summary))

Sieber, H. Die Berechnung von Zahlen groesser als 10^{100} mit dem Taschenrechner (Computation of Numbers Greater Than 10^{100} Using Calculators). Praxis der Mathematik 23: 325-330; November 1981.

The author demonstrates how to use mathematical thinking and cleverness to remove the limits of a calculator and obtain results greater than 10^{100}.

(Large numbers)

Sieber, H.; Fischer, O.; and Ebeling, F. 12 Transparencies that go with Taschenrechner im Unterricht (Pocket Calculators in the Classroom). Stuttgart, West Germany: Klett, 1978.

A collection of 12 transparencies assists in teaching how to use a programmable calculator. (In German.)

(Kit, Programmable calculators)

Sigg, Paul O. The Hand-Held Calculator: Effects on Mathematical Abilities and Implications for Curriculum Change. South Bend: Indiana University at South Bend, June 1982. ERIC: ED 218 147.

The author abstracts thirteen studies dealing with the effects of calculator use on computational achievement and attitude toward mathematics and another nine studies dealing with calculator effects on problem-solving ability. The paper concludes with a summary of results and a list of recommendations.

(Recommendations, Research (review))

Sissing, H. Rekenmachientjes en basisschoolleerlingen (Calculators and Pupils of Elementary School). Euclides 55: 409-416; June-July 1980.

Pros and cons of the use of calculators by elementary students are presented. (In Dutch.)

(Elementary, Pros/cons)

Sloff, Jan. Informatie Over Zakrekenmachines (Information about Calculators). Euclides 54: 367-373; May 1979.

The author discusses the various features of particular models of calculators currently available. (In Dutch.)

(Calculator keys, Four-function calculators, Programmable calculators)

Smith, Paula. The Impact of Computerization on Children's Toys and Games. Journal of Children in Contemporary Society 14: 73-82; Fall 1981.

The author warns that an indiscriminate reliance on computerized devices can damage the development of children's imaginations.

(Elementary, Pros/cons, Related (computers))

Snover, Stephen L. and Spikell, Mark A. Programming the TI-55 Slide Rule Calculator. Englewood Cliffs, New Jersey: Prentice-Hall, 1982.

This is a user's guide to the TI-55 calculator.

(Programmable calculators, Programming, Slide rule)

Souder, Lawrence G. Magnify Your Calculator's Display. Computers and Electronics 21: 52· February 1983.

Although these directions are intended for the TI-30, any cathode display calculator can produce a ½-inch digital display with the addition of a simple multiplexing circuit.

(Building, Scientific calculators)

Standifer, Charles E. and Maples, Ernest G. Mathematical Achievement of Third-and Fourth-Grade Students in Compensatory Education When Using Two Types of Calculators. Psychological Reports 51: 11-18; August 1982.

An earlier study by the authors showed calculators to be generally superior to both programmed-feedback calculators and conventional instruction in promoting mathematical achievement in normally achieving third-grade students. This present study showed similar results among fourth-grade compensatory students, but found that the programmed-feedback calculator produced generally superior retention of mathematical gains among third-grade compensatory students.

(Achievement, Attitudes, Elementary (grades 3, 4), Four-function calculators, Low achievers, Programmable calculators, Research)

Strauss, J. Der Taschenrechner in der Hauptschule (The Pocket Calculator at Secondary Modern School). Lehrmittel Aktuell 7: 18-22; May 1981.

The author examines the computational achievements of secondary students using calculators. (In German.)

(Pros/cons, Secondary)

Sturm, L. Der optimale Taschenrechner (The Optimal Pocket Calculator). In Zum Einsatz von Taschenrechnern im Unterricht (On the Use of Pocket Calculators in the Classroom) (H. Holler, Ed.). Duesseldorf, West Germany: Schwann, 1980.

Detailed criteria for the selection of a suitable calculator for various grade levels are given. (In German.)

(Selection)

Suydam, Marilyn N. Calculators: A Categorized Compilation of References. Supplement 2. Columbus, Ohio: Calculator Information Center, March 1982. ERIC: ED 213 598.

References on calculators compiled between December 1980 and March 1982 are listed, with categories indexed.

(References)

Suydam, Marilyn N. Hand-Held Calculators in Schools: Paper and Report from the Working Group. In Comparative Studies of Mathematics Curricula--Change and Stability 1960-1980. Materialien und Studien Band 19. Bielefeld, West Germany: Universität Bielefeld, Institut für Didaktik der Mathematik, 1980. Pp. 540-573.

This paper on international calculator uses in schools summarizes reports from 16 countries.

(Pros/cons, Recommendations, Research (summary), Status report)

Suydam, Marilyn N. The Use of Calculators in Pre-College Education: Fifth Annual State-of-the-Art Review. Columbus, Ohio: Calculator Information Center, August 1982. ERIC: SE 038 794.

This ten-page paper summarizes the research findings cited in the annual reviews of the past four years (1978-1981).

(Research (review), Status report)

Suydam, Marilyn N. The Use of Calculators in Pre-College Education: Fifth Annual State-of-the-Art Review. Iowa Council of Teachers of Mathematics 11: 19-26; Fall 1982.

This ten-page paper summarizes the research findings cited in the annual reviews of the past four years (1978-1981).

(Research (review), Status report)

Szetela, Walter. Story Problem Solving in Elementary School Mathematics: What Differences Do Calculators Make? Journal for Research in Mathematics Education 13: 381-389; November 1982.

The main purposes of this study were to determine if students who use calculators in story problems tend to try more problems, use more correct operations, and obtain more correct answers than students who use paper and pencil only. Results indicated that calculators helped students compute correctly but did not improve their ability to choose the correct operation.

(Achievement, Elementary, Junior high, Problem solving, Research)

Tammet, H. Computer, Programming and Secondary Education. In Modern Problems in Teaching Mathematics. Esthonia, USSR: Tallinn, 1979. Pg. 106-109.

The role of programming in the secondary curriculum is discussed. (In Russian.)

(Curriculum, Programming, Recommendations, Secondary)

Tatzl, G. Der Taschenrechner als Mini-Computer. Bd. 1 (The Pocket-Calculator as Mini Computer. Volume 1). Wiesbaden, West Germany: Bauverl., 1979.

This first of two volumes on the use of programmable calculators contains a general description of the calculator, elements of programming, applications, criteria of selection, and a compilation of examples. (In German.)

(College, Programmable calculators, Programming, Selection, Textbook)

Tatzl, G. Der Taschenrechner als Mini-Computer. Bd. 2 (The Pocket-Calculator as Mini Computer. Volume 2). Wiesbaden, West Germany: Bauverl., 1979.

This second of two volumes on the use of programmable calculators describes the requirements, possibilities, and problems connected with the use of these calculators in cost accounting. (In German.)

(Business mathematics, College, Programmable calculators, Textbook)

Tatzl, G. Der Taschenrechner als Mini-Computer. Bd. 3 (The Pocket Calculator as a Small Computer. Volume 3). Wiesbaden, West Germany: Bauverl., 1980.

This third volume of a series concentrates on the optimum utilization of calculators and microcomputers in industrial and engineering practice. In particular, the arithmetic jobs in a laboratory for testing of construction materials are considered. (In German.)

(Engineering, Post-secondary, Programmable calculators, Related (computers)

Thiessen, P. Programmieren von Taschenrechnern. Bd. 4 (The Programming of Calculators. Volume 4). Braunschweig, West Germany: Vieweg, 1980.

This text and exercise book introduces the reader to the programming of calculators using Hewlett Packard models. (In German.)

(Programmable calculators, Textbook)

Tontsch, John W. Applied Electronic Math, with Calculators. San Francisco: Science Research Associates, 1982.

The author shows how calculators can simplify the higher mathematics necessary to solve problems in electronics.

(Post-secondary)

Turinese, David Martin. A Use of the Hand Calculator in the Second Year Algebra Curriculum. (Boston University School of Education, 1982.) Dissertation Abstracts International 43A: 102; July 1982.

The purpose of this study was to compare calculator-oriented materials with a textbook approach to specific topics (sequences, series, limits). The calculator materials were more effective at achieving a basic level of understanding, but only equally effective as the textbook approach at achieving a higher level of understanding. No interaction was present between mathematical ability level and the two treatments.

(Algebra, Evaluation, Research, Secondary (grade 11))

Vance, Jim. Per Cent and a Pocket Calculator in Grade 7: A Pilot Project. VECTOR (B. C. Association of Mathematics Teachers) 21: 29-37; November 1979.

A report is given on a pilot investigation designed to examine the ability of seventh-grade students to use calculators appropriately in a learning and applying percent concepts.

(Junior high (grade 7), Percents, Ratios, Recommendations)

Van der Blij, F. Nabericht. Euclides 54: 383-388; May 1979.

Calculators are no "smarter" than their users. "A silly question," writes the author, "still receives a silly answer." The machine is used most effectively when the user understands the underlying mathematics. (In Dutch.)

(Attitudes, Calculator keys, Recommendations)

Vanhamme, W. De la presence des calculatrices dans la classe a la decouverte de notions mathematiques (Pocket Calculators at School Help to Discover Mathematical Concepts). Paper presented at the Seminar on Calculators in School Teaching, Luxembourg, Luxembourg, May-June 1978.

Two teaching experiments are described; the way pupils work with calculators was observed. (In French.)

(Elementary (grade 6), Junior high (grades 7-9), Research)

Vanhamme, W. Calculatrices en Premiere Secondaire (Pocket Calculators in the First Form of the Lower Secondary). Mathématique et Pédagogie 6: 35-41; May-June 1980.

Suggestions are made as to how pocket calculators can be used for introducing and motivating mathematical facts. (In French.)

(Junior high (grade 7), Roles)

Van Hiele, P. M. Het Rekenmachientje als Tabel (The Calculator as a Table). Euclides 54: 346-351; May 1979.

As calculators become prevalent in classrooms, there will be a shift in emphasis on the skills students need to learn. Two skills which the author feels will no longer be stressed are interpolation techniques and the ability to use tables of trigonometric and logarithmic values. (In Dutch.)

(Calculator keys, Recommendations)

von Kaenel, Pierre A. Math Seminars for Gifted High School Students. School Science and Mathematics 82: 254-258; March 1982.

"Calculating Machines" is suggested as one of six topics to be explored by gifted junior high students. Types of notation, power, accuracy, and limitations are possibilities for discussion.

(Course description, Gifted, Junior high)

Walser, H. Der Einsatz von programmierbaren Taschenrechnern im Unterricht (The Use of Programmable Pocket Calculators in Class). Didaktik der Mathematik 8: 27-38; 1980.

The programmable calculator is used for problems such as linear systems of equations, quadratic equations, calculating functional values, and integrals. (In German.)

(Classroom management, Programmable calculators)

Warner, Joan. Business Calculator Operations. Reston, Virginia: Reston, April 1982.

(Business education, Business mathematics, College)

Watson, F. R. Number Investigations. England: Mathematical Association, 1981.

This booklet contains 26 investigations spanning the range of secondary school number work, using calculators to improve and enrich instruction.

(Activities, Pattern searches, Problem solving, Secondary)

Watson, F. R. Using Calculator Games and Puzzles to Improve Mathematical Skills. Keele, England: Keele University, July 1982.

Each of the games and puzzles in this booklet illustrates some mathematical idea or practices some useful skill. The booklet was intended to provide "raw material" which teachers could adapt to individual circumstances. An outline of the purpose and mathematical content of each activity is included.

(Activities, Elementary, Games, Junior high, Problem solving, Secondary)

Watson, H. An Introduction to the Programmable Calculator. Mathematical Gazette 65: 5-10; March 1981.

Some beginning examples using a programmable calculator are presented.

(Programmable calculators)

Weber, H. and Grami, J. Numerische Verfahren für programmierbare Taschenrechner 1 (Numerical Methods for Programmable Calculators 1). Mannheim, West Germany: Bibliographisches Institut, 1980.

This book offers an introduction into the practical use of the TI 58/59 calculator for numerical methods in mathematics and engineering. The solution of a problem is formulated in Pascal first. (In German.)

(Engineering, Post-secondary, Programmable calculators)

Weir, Maurice D. Calculus by Calculator. Englewood Cliffs, New Jersey: Prentice-Hall, 1982.

This textbook develops and presents the standard methods and problem-solving techniques of single-variable calculus using specially prepared programs that are permanently recorded on magnetic cards for the TI 59 programmable calculator.

(Calculus, College, Programmable calculators, Textbook)

Wheatley, Grayson H. and Wheatley, Charlotte L. Calculator Use and Problem Solving Strategies of Grade Six Pupils. Final Report. West Lafayette, Indiana: Purdue University, April 1982.

Students (n = 330) were randomly assigned to either a Problem Solving (PS), Calculator Problem Solving (CPS), or Control group. The PS and CPS groups studied problem-solving heuristics applied to nonroutine problems for 18 weeks, after which 102 students in three ability groups were ran-

domly selected for posttesting. In interviews, they responded to five selected problems (PST). Seven students were identified as case studies. Results showed that the CPS and PS groups had significantly higher problem-solving success and used more strategies. The CPS students made fewer computational errors and required significantly less time for problem solving.

(Elementary (grade 6), Problem solving, Research)

Wiksten, Sif. Children's Learning of Addition and Subtraction Facts. (Rutgers University The State University of New Jersey (New Brunswick), 1980.) Dissertation Abstracts International 41B: 1550; October 1980.

One purpose of this study was to obtain further information on the effectiveness of training with or without the supplementary use of a calculator in acquiring addition and subtraction facts. Children had combinations of simultaneous and successive experiences. They improved equally well with or without calculators.

(Addition, Elementary (grade 1), Four-function calculators, Research, Subtraction)

Wilde, Carroll O. The Contraction Mapping Principle. Numerical Methods in Elementary Analysis. Modules and Monographs in Undergraduate Mathematics and its Applications Project. Newton, Massachusetts: Education Development Center, 1978.

An iterative technique for solving equations which can be implemented on a calculator is described. Sample problems, exercises, and a model exam are included.

(College, Iteration, Numerical analysis, Problem solving)

Wilkinson, Patricia Ridge. The Role of the Calculator in Remedial Mathematics. In Improving Mathematics Skills, (Geoffrey Akst, Ed.). San Francisco, California: Jossey-Bass, December 1981.

The author summarizes research results in her discussion of the place of calculators in remedial mathematics courses and the need to integrate calculators more fully into the core curriculum.

(College, Curriculum, Remedial, Research (summary))

Winkelmann, Bernard. Hand-Held Calculators and Mathematics Educators: Some Strategic Perspectives. In Comparative Studies of Mathematics Curricula--Change and Stability 1960-1980. Materialien und Studien Band 19. Bielefeld, West Germany: Universität Bielefeld, Institut für Didaktik der Mathematik, 1980. Pp. 574-596.

The status of calculator use, anticipated effects of the calculator on mathematical education, and the consequences these developments might have for the didactics of mathematics are discussed.

(Attitudes, Problem solving, Recommendations, Roles)

Wurz, L. Kennenlernen des Taschenrechners (Becoming Familiar with the Pocket Calculator). In Ehrenwirth Hauptschulmagazin 6: 47-50; December 1981.

A teaching sequence (three units) for grade 8 is presented. (In German.)

(Activities, Units)

Wynands, A. Bedingungen und methodische Anmerkungen zum Einsatz von Taschenrechnern in der Schule (Conditions of and Methodical Remarks on the Use of Pocket Calculators in School). In Zum Einstaz von Taschenrechner im Unterrich (On the Use of Pocket Calculators in the Classroom) (H. Holler, Ed.). Dusseldorf, West Germany: Schwann, 1980.

The author makes suggestions on the choice of pocket calculators and their use in grade 9. (In German.)

(Junior high (grade 9), Selection)

Zehna, Peter. Probability by Calculator. Englewood Cliffs, New Jersey: Prentice-Hall, 1982.

Written primarily as a supplement to other textbooks, this book provides the user with programs for the TI 59 which are designed to reduce the computational aspects of probability problems.

(College, Probability, Programmable calculators, Programming, Textbooks)

Zehna, Peter and Barr, Don. Statistics by Calculator. Englewood Cliffs, New Jersey: Prentice-Hall, 1982.

Written primarily as a supplement to other textbooks, this book provides programs for the TI 59 which are designed to reduce the computation involved in solving statistics problems.

(College, Programmable calculators, Programming, Statistics, Textbooks)

Zwaneveld, Bert. De Wiskundesektie en het Rekenmachientje (Questions and Answers about Calculators). Euclides 54: 374-378; May 1979.

The author answers some of the questions most commonly asked by new calculator users. (In Dutch.)

(Four-function calculators, Recommendations)

Calculate! Tel Aviv, Israel: Institute for Teaching Aids, 1982.

This workbook contains exercises for the four whole number operations, rounding off, percents, squares, and square roots, with calculator use encouraged. (In Hebrew.)

(Elementary, Worksheets)

Calculators. Newton St. Cyres, United Kingdom: Leapfrogs Project, 1977.

This booklet contains a number of problems, games, and situations for which a simple calculator should be used.

(Activities, Four-function calculators, Games, Problem solving)

Calculatrices 4 Operations (Four-Function Calculators). Paris: Association des Professeurs de Mathematiques de l'Enseignement Public, No. 31.

The construction and use of simple calculators are explained. Suggestions are made for using calculators to change mathematics teaching. The book also contains pros and cons on introducing calculators into schools. (In French.)

(Building, Pros/cons)

Les Calculatrices et l'Enseignement des Mathematiques (Calculators in School Teaching). Paper presented at the Seminar on Calculators in School Teaching, Luxembourg, Luxembourg, May-June 1978.

Proceedings of the seminar held in Luxembourg in 1978 are presented. (In English, French, German.)

(Pros/cons, Roles)

Chemical Engineering Magazine: Calculator Programs for Chemical Engineers. New York: McGraw-Hill, 1981.

Calculator algorithms suitable for mathematical applications in chemical engineering are provided.

(Engineering, Post-secondary)

"Classrooms, Calculators, and Careers". Charlotte, North Carolina: Walter J. Klein Company, Limited, 1981.

This film illustrates the role of calculators in the classroom as well as in a variety of professions.

(Business, Film, Roles, Technical occupations)

Handbook for Planning an Effective Mathematics Program. Sacramento: California State Department of Education, 1982.

This publication lists the characteristics of exemplary mathematics programs and supplies checklists to aid in assessing the quality of present programs. A section on using calculators and computers is included.

(Curriculum, Principals, Recommendations, Teachers)

Handreichung zum Einsatz des elektronischen Taschenrechners im Unterricht des Gymnasiums und der Realschule (Assistance for the Application of the Electronic Pocket-Calculator in Teaching at Gymnasium and Intermediate School). Donauwoerth, West Germany: Auer 1978.

This book contains descriptions, remarks, and problems on the application of calculators in teaching mathematics, physics, and economic sciences. (In German.)

(Economics, Physics, Secondary)

Ideas for Strengthening Mathematics Skills. Albany, New York: State Education Department, 1980. ERIC: ED 209 096. See also ED 161 730, ED 209 097 (Creole edition), ED 209 098 (Italian edition), ED 209 099 (French edition), ED 209 100 (Spanish edition), and ED 209 101 (Greek edition).

Presented in an overview in five languages of some specific schemes that have been successfully used by teachers to strengthen basic mathematics skills, including the use of the calculator in remedial mathematics.

(Remedial)

Low-Cost Calculators. Consumer Reports 47: 448-482; September 1982.

The authors identify Casio, Sharp, and Texas Instruments as the leading calculator companies and give a detailed report comparing their products to other brands. The report concludes with recommendations for consumers.

(Four-function calculators, Marketing, Selection)

The Mathematical Sciences Curriculum K-12: What Is Still Fundamental and What Is Not? Report to the National Science Board Commission on Precollege Education in Mathematics, Science, and Technology. Washington, District of Columbia: Conference Board of the Mathematical Sciences, December 1982.

One conclusion in this report is that the widespread availability of calculators and computers, and the increasing reliance of our society on information processing and transfer, should result in a new K-12 curriculum which reflects these changes.

(Curriculum, Recommendations, Related (computer), Roles)

Mathematics Framework and the 1980 Addendum for California Public Schools, Kindergarten Through Grade Twelve. Sacramento: California State Department of Education, 1982.

This addendum addresses issues not included in the original 1975 document. Among the suggestions for curricular reform is a section on "Impact of Technological Developments on the Mathematics Curriculum." Ideas in this section relating to the use of calculators are expanded in Appendix B: "Curriculum Considerations for the Use of the Hand-Held Calculator."

(Curriculum, Principals, Recommendations, Teachers)

Mathematics 104, 101, 100. Winnipeg, Manitoba: Department of Education, 1982. Pp. 33-34.

One section of this guide provides suggestions for the use of calculators in the classroom as well as pitfalls to be avoided regarding their abuse.

(Recommendations, Roles)

Mathematik für die 4., 5. and 6. Klasse: Mathematische Spieltherapie. Bd. 1, Bd. 2 (Mathematics for the Intermediate Grades: Math Play Therapy. Volume 1 and 2). St. Louis, Missouri: CEMREL, Inc., 1977.

This book is part of the Comprehensive School Mathematics Program curriculum for the intermediate grades. Small-group activities with a calculator, intended for slow learners, are described. (In German.)

(Activities, Curriculum, Elementary (grades 4-6), Learning disabilities)

Microcalculators in Schools? Uchitelskaya Gazeta No. 116, 1980; No. 150, 1980; No. 13, 1981.

Pros and cons of calculator use in schools are noted. (In Russian.)

(Pros/cons)

Le Minicalculateur Electronique (Electronic Pocket Calculators). Nico 23: 89-98; 1979.

Examples of how the calculator can be used to introduce interesting mathematical ideas are given. (In French.)

(Activities, Elementary)

On the Use of Microcalculators in Mathematics Teaching. In Modern Problems in Teaching Mathematics. Esthonia, USSR: Tallinn, 1979.

Comments on the use of calculators for mathematics instruction are given. (In Russian.)

(Roles)

Sammanfattning av Gruppdiskussionerna under Konferensen (Discussion Summary). Nämnaren 5: 78-94; December 1978.

This article summarizes the group discussions at a conference on calculator uses in schools. (In Swedish.)

(Roles)

Small Electronic Calculators. Consumer's Research Magazine 65: 11-15; July 1982.

Characteristics and ratings of calculators are given.

(Selection)

Strategies for Using the Hand-held Calculator in Mathematics Instruction. In Mathematics for Georgia Secondary Schools. Atlanta: Georgia Department of Education, 1981. Pp. S-18 - S-27. ERIC: ED 214 774.

This section of the guide presents activities for (1) the calculator as an instructor and (2) the student as an instructor to the calculator.

(Activities, Secondary)

Der Taschenrechner hat sich durchgesetzt (The Calculator Has Made Its Way). ibf-Spektrum 353: 7; 1980.

Statistics on the use of calculators in mathematics instruction in Austria are given. Ninety percent of the high school classes use calculators. (In German.)

(Research, Status report)

Taschenrechner in Klass 10 (Calculators in the 10th Grade). IMU - Informationen zum Mathematikunterricht 5: 31-39; October 1980.

Aids, examples, and exercises on developing a way to compute with powers, higher roots, and logarithms using a calculator are given. (In German.)

(Logarithms, Powers, Roots, Secondary (grade 10))

"Taschenrechner im Unterricht" (Introduction to Pocket Calculators). Freising, West Germany: Texas Instruments Deutschland.

Fifteen transparencies together with detailed explanations help explain the structure and functional charactersitics of a calculator. (In German.)

(Calculator keys, Kit)

"Temanummer om Räknedosor" and "Miniräknaren i day och i morgon". Nämnaren, September 1976, December 1978.

These issues of the journal focused on calculator topics. (In Swedish.)

(Activities, References, Roles)

Voorbericht (Foreword). Euclides 54: 337-341; May 1979.

This article introduces the issue of this journal on calculators. (In Dutch.)

(Roles)

Ein Zungang zur Differentialrechnung über Polynomfunktionen unter Einsatz des Taschenrechners (An Approach to Differential Calculus by Polynomial Functions Using a Pocket Calculator). In Zum Einsatz von Taschenrechnern in Unterricht (On the Use of Pocket Calculators in the Classroom) (H. Holler, Ed.). Dusseldorf, West Germany: Schwann, 1980.

Calculators are used in calculus for such topics as the expansion of polynomials up to the derivation of polynomials. The idea of approximation is emphasized. (In German.)

(Calculus, College)

INDEX

This index is designed to help the user locate references to designated areas of concern related to the use of calculators in education. It should be noted that the cross-referencing is not exhaustive: there may be other references which could be pertinent, but have been omitted due to oversight.

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